

GROUP TESTS

144 Turbo PCs

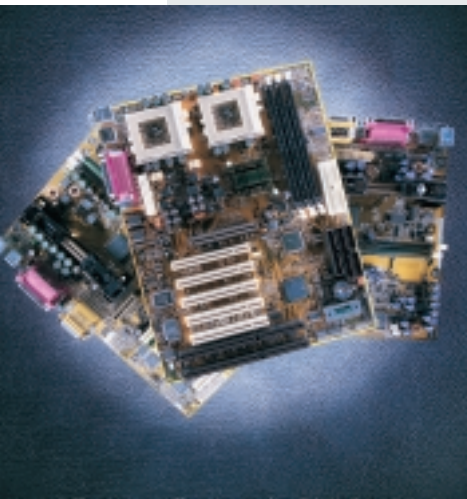
What do home power users need from their machine? We pushed 11 top-of-the-range machines, both AMD and Intel-based, to the limit



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Adding components piecemeal to maintain a **cutting-edge machine** is a fallacy the PC thrives on.

Upbraiding upgrading



The world of the personal computer moves forward at a frightening rate. No other purchase you make will be outdated quite as quickly as a PC. Of course if a faster PC becomes available after you've bought yours it doesn't make

your equipment redundant, but you can't help feeling cheated when you buy cutting-edge technology one month, only to find that it's been superseded the next.

The answer to this problem is upgradability. The PC is supposedly an upgradable platform, so when it starts to get long in the tooth you can simply replace a couple of parts and make it cutting edge once more. Unfortunately it's not quite that simple. The problem with upgrading is compatibility. The chances are that you're likely to want to upgrade your PC after a couple of years, but you'll probably find that it's more trouble than it's worth. In the two years that you've had your machine-processor technology would have moved on so far that your current motherboard won't support the latest CPUs. Straight away this means that you'll have to rip out the guts of your system and rebuild it from scratch.

But it doesn't end there. In the two years since you bought your computer, memory technology has probably advanced as well, so the chances are your existing system memory won't be compatible with a new CPU. Add to this the fact that graphics cards advance at an even faster rate than processors and the cost and effort of upgrading a PC becomes prohibitive.

The key is to buy the best system you can get at the point of purchase rather than settling for less with the intention of upgrading later. But buying the best system you can get doesn't necessarily mean spending a fortune on the fastest technology available. For the majority of users the fastest Pentium III CPUs aren't necessary and Intel's cheaper Celeron can easily handle the job at hand.

Unfortunately Intel doesn't want people choosing the Celeron over a Pentium III and has tried to relegate the Celeron to low-specification systems that can't handle the type of tasks that a Pentium III machine can. Intel has managed this by introducing the 810 and 810e chipsets for the its Celeron CPUs. These chipsets lack

features that the 820 or even BX chipsets sport. The 810 chipsets feature an on-board graphics solution which is no match for any current 3D graphics accelerator. This makes an 810 chipset-based machine inadequate for games; something that's a major consideration when buying a home PC. Most alarming, though, is the lack of an AGP slot, so the user isn't even left the option of using a decent graphics card to improve performance.

Unfortunately this is just one example of Intel making things difficult for the end user. A few years ago Intel turned its back on its socketed designs for its CPUs, switching to Slot 1 instead for the Pentium II and subsequent Celeron and Pentium III designs. However, after the failure of the original Celeron with no Level 2 cache Intel decided to put 128KB of Level 2 cache on the processor die. Intel then realised there was no need for the Celeron to be produced in an expensive Slot 1 design and returned to a Socket, this time calling it Socket 370.

As if this revolution wasn't enough, the latest generation of Coppermine Pentium III chips also have full speed on-die cache, making the Slot 1 design

The key is to buy the BEST SYSTEM YOU CAN GET at the point of purchase rather than settling for less with the intention of upgrading later

completely redundant. Already we've seen Intel's Flip Chip (see page 70), which is a Coppermine Pentium III in a socket. So after years of design changes and updates, Intel has produced a processor almost identical to its ill-fated Pentium Pro that was released back in 1996.

The Pentium Pro never fulfilled its potential due to high cost and the fact that Intel didn't push the speed further than 200MHz, leaving a great many people with expensive Socket 8-based workstations and servers with no processor upgrades available. That said, it wasn't all Intel's fault. The Pentium Pro was optimised for 32bit code and Windows 95 was still based on a 16bit core, so to all intents and purposes it was ahead of its time, a factor that usually counts in a product's favour.

So what's the answer to the upgrade issue? There isn't one, other than to forget that the PC should be upgradable and see it as a one-off commodity.

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WELCOME TO THE **MARCH 2000** PERSONAL COMPUTER WORLD CD-ROM

March COVER DISC

GAMES **APPLICATIONS** LIBRARY ENTERTAINMENT INTERNET

We've got two great full programs this month: Morph Studio and, for anyone who wants to develop web pages beyond simple HTML or build applications using the cross-platform language, Java, we have a full copy of Borland's JBuilder™ 2 Professional.

JBuilder 2 Professional

FULL VERSION



JBuilder 2 Professional
JBuilder goes beyond RAD, re-use and advanced compiler technology. It provides the scalability, reliability and extensibility necessary to build business-critical applications that span the enterprise. Builder 2 supports JDK 1.2 as well as other JDK versions via JDK Switching. JBuilder

The JBuilder Editor has many powerful features that enhance your ability to work with text and code. In conjunction with JBuilder's three-pane AppBrowser, the editor provides both editing and navigation. It is a full-featured, syntax-highlighted programming editor with several popular keymappings.

JBuilder established itself as the world's leading high-performance Java Rapid Application Development (RAD) tool. JBuilder 2 is the definitive tool for building truly cross-platform database applications that maximise the potential of 100 per cent pure Java. The benefits of this are:

- Write once, run anywhere applications
- Reduced maintenance and administration
- Simplified planning and implementation
- Lower development costs.

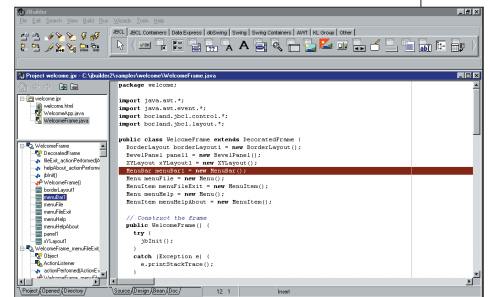
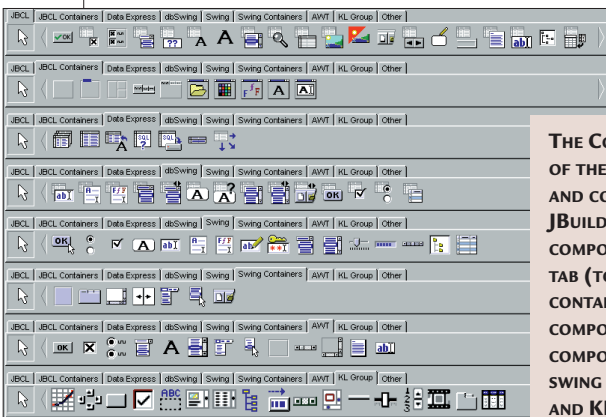
also includes a library of more than 200 Sun and third-party Java Beans.

Also included with JBuilder is Local InterBase 5.1.1. Small and powerful, InterBase includes advanced database features in only 2MB of RAM. No other SQL database rivals InterBase for ease of installation, use, and administration.

And that's not all. There's also Referentia for JBuilder – the fastest way to get productive in Java programming on

Borland JBuilder. Narrated lesson animations and 3D concept visualisations get you up and running fast.

THE COMPONENT PALETTE DISPLAYS MOST OF THE VISUAL JAVA BEANS COMPONENTS AND CONTAINERS DELIVERED WITH JBuilder. EACH PACKAGE OF RELATED COMPONENTS IS DISPLAYED ON A SEPARATE TAB (TOP TO BOTTOM: JBCL COMPONENTS; CONTAINERS; DATAEXPRESS DATA-AWARE COMPONENTS; JFC SWING DATA-AWARE COMPONENTS; JFC SWING COMPONENTS; SWING CONTAINERS; AWT COMPONENTS; AND KLGROUP COMPONENTS)

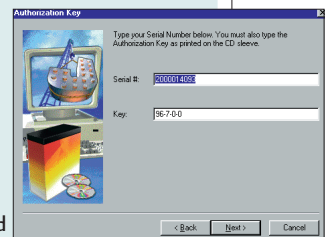


Installing JBuilder

You can install JBuilder and additional modules directly from the PCW CD-ROM menu. When prompted, you will need to enter a serial number and authorisation key: Serial: 2000014093
Authorisation key: 96-7-0-0

IMPORTANT

If users of previous versions wish to install this version of JBuilder to the same location as your previous version, be sure to uninstall the previous version of JBuilder first. Manually delete the jbuilder\bin and jbuilder\lib directories that may remain after uninstall is run and then install this version of JBuilder.



Getting started with JBuilder

Here's a short tutorial (also available online from within JBuilder), which demonstrates just how easy it is to create Java applets or applications using this powerful software. This 'hello world' example doesn't do very much... but it shows what can be achieved in just five minutes.

1 Creating your project

Choose File|Close All to close any open projects or files. Choose File|New and double-click the Application icon. To create an applet instead of an application, double-click the Applet icon instead. The Project Wizard is displayed. (JBuilder requires that you have a project open before you create an application or applet.)

For both applications and applets: Enter `JBuilder\myprojects\hello\hello.jpr`

(Key: `<code> code string continues`)

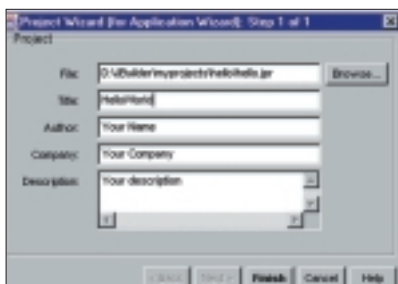
in the File text field. Use the letter of the drive where JBuilder is installed.

Enter

`HelloWorld`

in the Title field. You can also enter your name, company name, and a description of the application or applet in the appropriate fields.

The Project Wizard should look like the screenshot below:

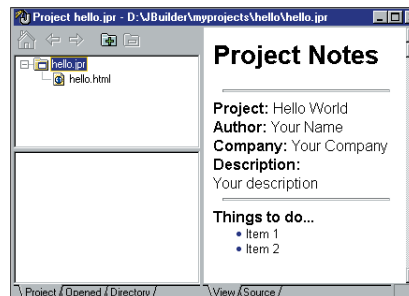


The only difference in the Project Wizard for application or applets is in the title bar display – for applications, the title bar displays '(for Application Wizard)'; for applets, it displays '(for Applet Wizard)'.

Click the Finish button. The AppBrowser appears showing the HTML page 'Project Notes' with the information you entered in the Project Wizard. The AppBrowser display is identical for applications and applets (see screenshot at the top of the next column).

2 Generating your source files

The Application and Applet Wizards create the .java files to go into the project skeleton created by the Project Wizard. The



Applet Wizard also creates the HTML file that runs your applet. The wizard automatically appears after you click the Finish button in the Project Wizard. Decide whether you want to create a Java application or applet.

To create an application, see Generating source files for an application below.

To create an applet, skip to Generating source files for an applet.

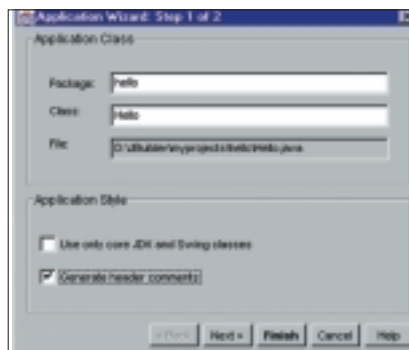
Generating source files for application

Enter

`Hello`

in the Class field. This is a case-sensitive Java class name. You don't have to enter the package name; you entered it in the Project Wizard. Make sure that the Use Only Core JDK and Swing Classes option is unchecked.

Check Generate header comments, so that the information you entered for the Project Wizard will appear at the start of the all source files that the Application Wizard generates. The Application Wizard should look like the screenshot below:



Click the Next button and the Step 2 dialog box will appear. Enter

`HelloFrame`

in the Class text field (for Frame Class).

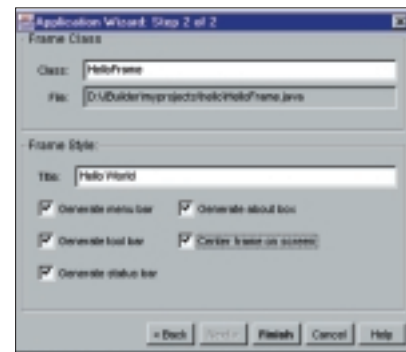
Enter

`Hello World`

in the Title text field (for Frame Style). Check

all check boxes for additional application features. The code to support these features is generated by the Application Wizard.

The Application Wizard should look like the screenshot below.



Click the Finish button. The new .java classes, .html files, and .gif files are added to your project. Choose File|Save All to save the source files.

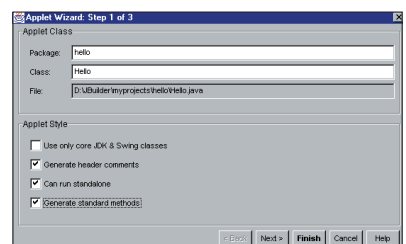
Generating source files for an applet

Enter

`Hello`

in the Class field. This is a case-sensitive Java class name. You don't have to enter the package name; you entered it in the Project Wizard. Make sure the Use Only Core JDK and Swing Classes option is unchecked. Check the other three Applet Style boxes.

The Applet Wizard should look like this:



Click the Next button. The Step 2 dialog box appears, where you enter applet parameters. Enter

`test`

in the Name field. Choose

`String`

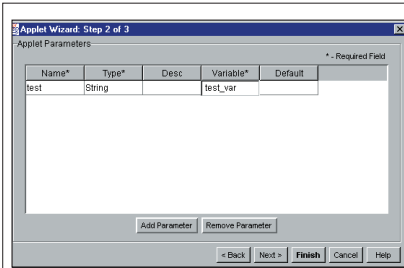
from the Type drop-down list. Enter

`test_var`

in the Variable field. The Applet Wizard should look like the screenshot on the

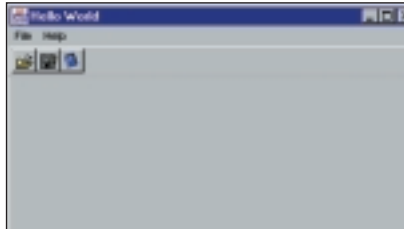
following page.

Click the Finish button. Although there is a Step 3 dialog box for the Applet Wizard,



clicking Finish at this point accepts the defaults for that step. The new .java class and .html files are added to your project. The three files in the project are:
hello.Hello.html: The applet HTML file.
hello.html: The project HTML file.
hello.java: The applet source file.
 Choose File|Save All to save the source files before continuing.

3 Compiling and running your app
 Choose Run|Run, press F9 or click the button that looks like a lightning flash to compile and run your application. Your application or applet is displayed. Applets are displayed in the Applet Viewer. In this example, the applet only consists of a title bar; it does not contain a menu bar or button bar. Your application should look like the screenshot below.



If you've created an application, you can click any of the buttons on the toolbar. However, because no events are hooked up to these buttons, nothing happens. Choose File|Exit to close your application. Click the close box to close your applet.

And, if that's given you a taste for making Java, you'll find plenty more examples and tutorials in the extensive online Help within JBuilder itself.

PCW DETAILS

System requirements Intel Pentium 90MHz or higher, Windows 95/98 or NT4, 48MB of memory (Win 95/98), 65MB of free hard-disk space for compact install, CD-ROM drive, SVGA or higher-resolution monitor (800 x 600), mouse or other pointing device
Sales contact 0800 454065

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Morph Studio

FULL VERSION

This suite of morph-centric graphics programs does much more than just morph. You can create morph movies, animating between one image and another, as well as adding sophisticated special visual effects. What's more, Morph Studio comes with an additional program for organising your audiovisual image libraries (complete with a selection of photos to get you started), plus presentation tools and even a CD player!

Ulead Morph Editor

Morph Editor is a fun, easy-to-use program that allows you to take an image and then transform it, or part of it, into another. By animating this transformation process, you can create a video sequence that shows the original image growing out of, or into, the other – such as a man changing from a woman or a bird becoming a plane.

To add an even greater impact to your morphing work, Morph Editor comes with a range of advanced special effects and filters that can enhance and improve your images, turning otherwise standard morphs into stunning and eye-catching presentations.

The basics

Morphing is all about change; distorting the features or subject of one image, the start image, into another, the end image. How this distortion takes place is controlled by control points and control lines.

To better illustrate the use and behaviour of these control points and lines, it is useful to take a look at some of the common effects that can be created in Morph Editor, beginning with performing a crossfade.

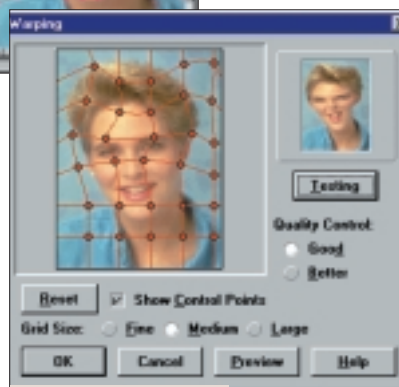
This occurs whenever you perform a morph operation without placing any control points or lines. As such, the start image will gradually fade out while the end image fades in. Halfway through such a



sequence the frame consists of 50 per cent of the start image and 50 per cent of the end image.

The problem with crossfading, however, is the 'ghosting' effect, or shadowing, that occurs when the images are fading in and out, as well as the lack of distortion. By placing control points and lines in strategic positions on and around the features of the images you want to morph, you can better control how one image merges into the other.

After installation you will find a sample morph file (MOF) in the SAMPLES subdirectory under your installation directory. To open this file, or any other morph file, choose the Open command in the File menu. The Open dialog box appears. To open the sample file, simply click on its filename and press OK. (Double-clicking on the filename also opens the file.) The dialog box then closes and the file is opened in the Morph Editor



THE USEFUL WARP FEATURE ALLOWS YOU TO DISTORT ONE OR BOTH IMAGES USING A DRAGGABLE 'MESH'

workspace.

Morph files are displayed in the control window, which consists of two image windows and a toolbar. The image windows display your start and end images with any control points or lines that you have defined. The toolbar contains tools for applying and manipulating the control settings and

provides direct access to commonly used menu commands. (When you position your mouse over a tool in the toolbar, a hint message appears in the status bar describing the tool's function.)

Both images placed into a control window must be of the same dimensions. If they

are different, you can crop or resample them accordingly.

The total number of pixels in an image must be divisible by four. If it is not, Morph Editor automatically crops the image. (At most this will result in a loss of three pixels.)

Morph Editor only works with greyscale or RGB True Color images. If you use an Indexed or Hi-Color image, it will be converted to RGB True Color; black & white images are converted to greyscale.

PCW DETAILS

Platform

Morph Studio works with either Windows 3.1 or 95/98. You'll need a Pentium PC or faster, with 5MB of hard disk space free (20MB recommended), and SVGA display.

Technical information to help you use the CD

✓ How to use the CD-ROM

Put the disc into your CD drive: If you've got Windows 9x the PCW interactive loader will appear on your screen. If your CD doesn't autoload, go to Start/Run and type in <CD Drive>:\pcw.exe

Windows 3.1 From Windows Program Manager, choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.

✓ Faulty discs

If you have a faulty disc please return it with your name and address, clearly marked 'PCW CD MARCH 2000' to:

TIB plc

HelpLine Returns

Unit 5 Triangle Business Park

Pentrebach

Merthyr Tydfil

Mid Glamorgan CF48 4YB

quoting ref 'PCW Vol 23 No 3'.

A replacement disc will be sent to you.

NOTE: These cannot be supplied direct from VNU.

✓ Technical support

If you have technical problems with individual products, please check in the magazine or on the CD for the manufacturer's support contact details. For general problems with the CD, the Technical Helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm on 01685 354726.

A live technical info page is also available through CDOnline direct from the CD.

✓ Getting software on to the CD

Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc. For covermount enquiries please telephone Jonathan Hardy on 020 7316 9851 or email jonathan_hardy@vnu.co.uk

IMPORTANT NOTICE

The publisher, VNU, has checked the PCW CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system, which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc.

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Happy millennium for the bug that just refuses to die

Survivalists slunk sheepishly from their Y2K havens at the New Year after the millennium bug's bark proved worse than its single inadequate byte. Britain's Y2K watchdogs must have known before the millennial rollover they were on a hiding to nothing: damned if the worst happened; damned if it didn't.

Sure enough, when global catastrophe failed to materialise there were claims of an expensive hype. Critics contrasted Russia's estimated £125m spend with the billions spent in the US – ignoring the fact that £125m is a lot in a near bankrupt, low-wage economy and the US had a lot more to spend money on.

Also cited was Italy, ranked

with Honduras for its preparedness. The head of Italy's Y2K commission was quoted as saying: 'Italians generally don't plan.' But Italians aren't stupid, either, and you can bet they put critical systems through their paces. (Italy provided one of the best Y2K stories. A man in Florence, fearing global collapse, withdrew over £2,000 on New Year's Eve – and was promptly mugged).

A true audit of the Y2K bug would be impossible. Much of the spending was on systems that needed updating. Bug-hunters did talk up and make money from the problem; but so does the anti-virus industry – and so it should.

The bug caused just 67

'significant' problems across the world in the first week of January, according to one estimate. One military satellite and seven nuclear power stations were hit – not seriously, but giving a hint of what might have happened.

An unchecked Y2K bug could have caused a catastrophe big enough to justify any precautions. It was a real threat, and it still is.

Robin Guernier, head of the independent Taskforce 2000, pointed out that 35 per cent of problems were expected last year and five per cent at rollover. That leaves 60 per cent, most no more than irritations, to come. The next big panic – p25
The last big hype – p20

Telewest unveils unmetered surfing

One of Britain's big two cable firms is offering a cheaper rival to BT's unmetered Surftime net access.

Telewest customers can get unlimited access for £10 a month from 14 February. This includes service-provider charges from Cable Internet, which is to get a new front end from Microsoft's MSN.

Telewest's 'Surfunlimited' offer is part of an aggressive deal to wean people from BT to cable. Calls to fellow cable users are free and national calls cost from 1p off-peak to a maximum of 3p a minute.

BT Surftime will charge £6.99 for unlimited weekend access, £14.99 all-week off

peak, and £34.99 at any time. This excludes ISP charges.

Surftime will be sold through ISPs using BT lines. BT is hammering out a deal with phone watchdog Ofcom and other parties to provide rival telcos such as Energis a level competitive field.

Telewest's offer refers to its standard phone lines. It expects to start rolling out set-top boxes with cable modems this spring; standalone modems will be on offer by the summer.

A £40-a-month cable modem service is already available from NTL in Surrey, Hampshire and Glasgow. It will roll out to other areas,

probably starting with Nottingham and the Midlands, over the year. A spokesman said NTL is likely to offer unmetered dial-up but no date has been set.

Both NTL and Telewest are also trying out ADSL services based on standard phone lines. They will use BT's 'local loop' – the line between the subscriber and the local exchange – when it is opened up to competition next year. This will allow them to offer services to businesses, few of which have cable connection, and to homes outside their franchise areas.

Surfunlimited 01705 714209
www.bt.com; www.ntl.com



Many investors have identified Britain as a potential major hub in the emerging wired world. Among them is Globix, a US company that has set up a purpose-built data centre in London. Pictured is the control room at the high-security centre, sitting on a 1.8Gbits/sec backbone and housing critical ecommerce servers.
www.globix.com

POCKET PC

Ailing CE brand gets out of hand

Microsoft has dropped the label Windows CE for its next-generation handheld platform in a bid to boost the operating system.

The Pocket PC brand will be used to describe both the handheld hardware and its operating system – a modified version of Windows CE 3.0, codenamed ‘Rapier’.

Analysts said the rebranding is a bid to mask the Windows CE brand, which has not sold as well as expected. Intel snubbed CE in favour of Linux for its new web boxes (see p28).

Microsoft says the change

will help reduce confusion over Windows CE, which is used in numerous different environments including industrial machinery, cars, games machines, set-top boxes and palm-sized PCs, according to Dilip Mistry, marketing manager at Microsoft UK.

But senior Gartner Group

analyst Michael Gartenberg said: ‘CE has become a bit of a liability for Microsoft... It certainly hasn’t been associated with success.’

He added: ‘This is clearly CE’s last chance. If this next iteration fails, then CE’s future in this type of device will be questionable.’

Gartenberg said that while

Microsoft has taken a lot of criticism for Windows CE, the hardware manufacturers should share the blame.

‘CE was hampered by very poor hardware design,’ he said. ‘Prices need to be lower, battery life longer and devices smaller.’

See Tim Bajarin, p38

ANDREW CRAIG, VNUNET.COM

Pocket PCs turn into mobile libraries

Microsoft is touting its latest Pocket PCs as multimedia players and eBooks. The devices will

include the latest Windows Media Player, as well as Microsoft Reader software with ClearType – which the company claims gives LCD screens the readability of traditional printed books.

It works by addressing the RGB components of each pixel (see left), something that is not possible with cathode-ray screens.

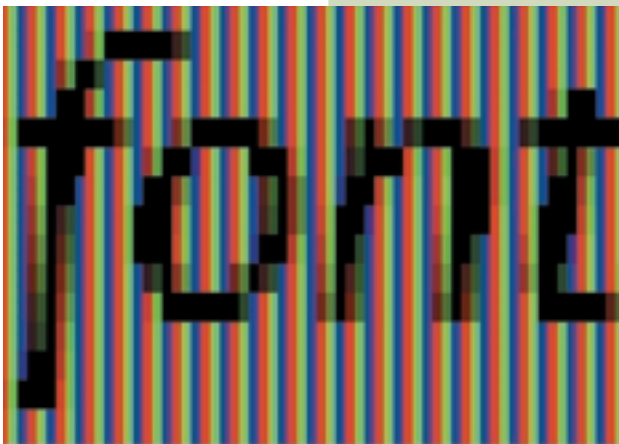
Microsoft showed off its first pocket eBook at the Consumer Electronics Show in Las Vegas. First production models are expected to ship in the first half of this year.

Dick Brass, vice-president of technology development at Microsoft, said: ‘The typical Pocket PC will be able to store hundreds of books, from today’s latest titles to long-revered literary classics.’

Thousands of titles will be available to Pocket PC users online. Microsoft Reader includes a copy-protection system designed to curb piracy.

Microsoft Reader will be available for Windows-based PCs and notebooks in 2001.

VNUNET.COM



Windows 2000 ready to hit the shops

Microsoft is gearing up for its biggest product launch for nearly five years. No-one expects the media impact of Windows 2000 on 17 February to match that of Windows 95. Win95’s uptake took even Microsoft by surprise – and it had spent £125m building it up (see Point of View, p20).

Win2000 is unlikely to sell even as fast as Windows 98 at launch, although it is undoubtedly more important. This is partly because it is not aimed at consumers, but many



companies are also holding back to see how others cope with any teething problems. IDC analyst Dan Kuznetsky believes most will wait until the bugs have been fixed. ‘This won’t be adopted right away,’ he said.

Vendors such as IBM, Dell and Hewlett-Packard, are providing hardware upgrades and technical support to help firms make the changeover.

There are four versions of Win2000: Professional – for the desktop; Server – supporting machines with up to four processors; Advanced Server – supporting up to eight; and (due in six months) Datacenter. Win2000 has had numerous setbacks, including a significant redesign and the results of a management reshuffle just over a year ago.

One big selling point is the

fact that notebooks, which were never happy with NT, can use Win2000 Professional.

This makes it easier for companies to use the same OS on mobiles and desktops.

But Linux is eating into some potential Win2000 markets and its new 2.4 kernel is expected to be released at the same time.

IDC analyst Peter Lemon said: ‘I’m sure Linux is going to do whatever it can to steal Windows 2000’s thunder. That’s the fun part.’

ADDITIONAL REPORTING

VNUNET.COM

Fast data services won't come cheap

Cellular upstart Virgin Mobile has launched a suite of Internet services using current generation phones – claiming that the newer Wireless Application Protocol (WAP) mobiles are too scarce and expensive for a mass market.

The company's head of

advanced technology Richard Williams also says that emerging fast mobile data services will be too expensive for most people.

The new services rely on Virgin's Advanced Wireless Technology Platform, which takes advantage of the relatively large 32KB of

memory in its mobile SIM cards.

The technology uses SMS (Short Messaging Service), which normally restricts messages to 160 characters. Virgin links together SMS bursts in order to provide a full-email service with messages and attachments

consisting of up to 32,000 characters.

Virgin's browser can access WAP sites because it understands WML, the subset of eXtended Markup Language (XML) used by these sites. Users will be able to download lists of phone numbers, as well as music and television listings, plus rail timetables.

Services will also include ecommerce, and users will receive special offers such as last-minute cut-price air tickets. Wilson says that the inherent security of cellular networks makes etrade relatively simple to implement.

Virgin Mobile, a 50/50 joint venture with One2One, was launched in November last year boasting of simple 'no rip off' pricing structure. It charges no monthly fees, and does not subsidise handset prices. Calls cost 15p per minute for the first 10 minutes each day, 10p for the next 10 minutes, and 5p after that. Calls to other mobile networks cost a flat 35p a minute.

www.virgin.com/mobile

See also news analysis p46.



Hitachi unveils 2GB SDRAM

Hitachi Europe has introduced what it claims are the world's first 2GB SDRAM modules. They pack 72 256Mbit chips on a 168-pin DIMM card and support a 100MHz bus. Meanwhile, there were mixed message from Intel and memory specialist Kingston over RAMBUS memory, which took a big credibility hit last year – see p37.

RSI hits health body

Ninety staff have been hit by repetitive strain injury (RSI) at the Health and Safety Executive (HSE) – whose job includes advising keyboard users how to avoid the problem.

You might think that the HSE, which also advises employers on how to avoid and treat RSI, would be put out by the news.

But a spokeswoman said: 'If more companies admitted they have RSI problems we would make this issue more open... Too many employees are afraid to admit they are suffering until [RSI] becomes debilitating and they are unable to work.'

VICKY AUGUST
VNUNET.COM



He wanted to warn people about the danger of jumping out of windows

IMAGING

Clive Akass has the latest on the super-powerful and flexible compression standard.

JPEG 2000 already making waves

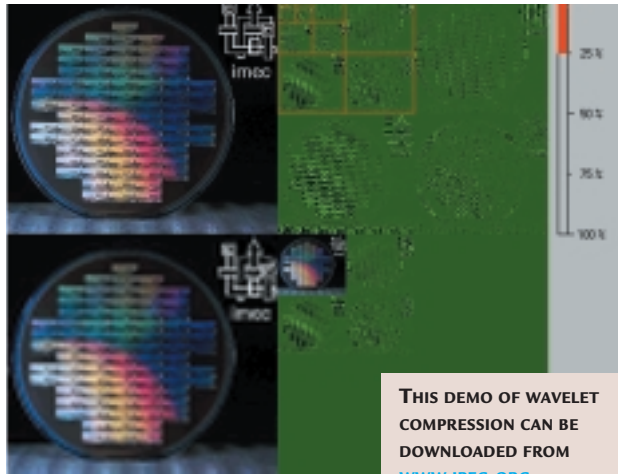
A new compression standard to be agreed this year promises smaller and more flexible image files.

Experts have been working on JPEG 2000 for more than three years and at its centre is a radically different form of compression from the Discrete Cosine Transform used in earlier JPEG standards.

JPEG 2000 uses wavelets, a refinement of the Fourier Transform which expresses complex waveforms as a set of sine waves of different frequencies. Wavelets use shapes rather than the regular sine wave and are better at modelling many phenomena, including image transitions.

JPEG 2000 maps an image at increasing levels of detail, producing files that can be transmitted, viewed or printed at any required resolution – including lossless, in which the image contains all the information in the original.

A web designer will be able to use the same file to



transmit an image at different resolutions for different target devices, a feature that may become more important with the proliferation of web devices. Users can decide the resolution at which they wish to receive a picture.

JPEG 2000 will simplify the structure of sites with the option of seeing high-res versions of thumbnails; these currently need to hyperlink separate files for each

resolution. Similarly, some digital cameras store both thumbnails and full-res images.

The Flashpix format also addresses this problem, but its files are 20 per cent larger than a standard JPEG. By contrast, JPEG 2000 files are 20 per cent smaller, and contain more information. Other JPEG 2000 advantages include:

- Fewer 'artefacts', or blemishes on decompressed

images. The difference between old JPEGs, which deal with blocks of pixels, and the wavelets of JPEG 2000 is like the difference between using a straight and torn edge when patching patterned wallpaper. The torn patch is less visible as the jagged edge merges better into the pattern.

- Publishing houses can use the same file for fast, rough proofing and for the final high-res output.
- Bandwidth is not wasted downloading unnecessarily detailed images.
- Current JPEGs offer only basic RGB information; JPEG 2000 can carry CMYK, and ICC profiling used for tight colour matching; there is also provision for other 'metadata', including timestamps.

Developers are already offering 'near JPEG 2000' compression but agreement on the standard is not expected until late this year.

www.jpeg.org
www.digitalimaging.org

POINT OF VIEW

The Windows to the world

There comes a point with a manufactured news story when it transcends hype and takes off under its own momentum. Hype involves pushing a story, talking it up. Hype succeeds when it does itself out of a job.

This happened when Microsoft launched Windows 95. It spent more than £125m on marketing but got far more publicity than money could buy.

Quite why the media went so crazy on the story remains a mystery. Win95 got a front-page review (albeit negative) in *The Guardian* on launch day and headlined on the main radio and TV news. I knew it had hit blanket coverage when it made lead story on *Woman's Hour*.

That was less than five years ago, but it was a very different world. I'd guess nine in 10 people reading about Win95, and not a few writing about it, had only the haziest idea what it was all about. Computing was still done largely by experts, and Microsoft had yet to latch on to the importance of the Internet.

Microsoft executives, as I never cease to remind them, assured us all that Win95 would run in 4MB of RAM, standard for PCs at the time. In truth if you wanted to run it at a sensible speed you needed to upgrade your PC.

The Micro-softies weren't lying: they were

repeating what they had been told. Microsoft learnt its lessons (it's good at that) and has been far more open about the hardware needs of Windows 2000.

This is as much a technological advance as Win95 was over Win3x, but it won't get anything like the same coverage. The media frenzy over Win95 turned out to be justified: the OS introduced a fair proportion of the world to computing. No software is likely to have that kind of impact ever again. With one in five UK homes owning a PC, we are all old hands now.

Clive Akass



on the OS that cleaned up

POST-MILLENNIUM BUGS

Number change sparks update fear

Computer users face yet another dodgy deadline as the Y2K panic begins to subside. Rolling deadlines for the UK phone-number changes have been set for the coming months but many, perhaps most, databases and organisers will need updating by 22 April.

The changes will be particularly necessary for contact management and telephony software that dials numbers for you. Dial-up web-access software may also need to be fed a new number.

Main changes are that all mobile numbers will start with 07, and there are new codes for Cardiff, Coventry, London,

Northern Ireland, Portsmouth and Southampton.

The new and old numbers have been working in parallel for the past few months. The first thing to check, if you work in a big office, is whether your switchboard can cope with the new codes – it may, for instance, bar the new 020 London codes.

Old local numbers, as opposed to ones dialled with the national STD code, will not work from 22 April. This means, for instance, that to ring PCW's main switchboard number from central London you will have to ring either 0171 316 9000, the new 020 7316 9000 or 7316 9000 –

the old seven-figure local code will not work.

The 0171 version, and other old city codes, will be phased out between August and September. This means that if your software lists and dials national codes with each and every number, you have until August to make your updates.

Mark Whitehorn's *Hands On* workshop (PCW, January) on updating large databases is now available online at www.vnu.co.uk/theconnection. To date we have seen remarkably little software help for people wishing to change Outlook and other personal data files.

A spokeswoman for the Big Number organisation, which is co-ordinating the changes, said: 'A lot of people have been concentrating on the Y2K problem.'

Microsoft has no plans to provide help for its Office suite. A spokeswoman said: 'We have left these things to third-party developers in the past.'

Full details of the changes

and their deadlines are at www.numberchange.org.

Quick fix

A generic solution for organisers is to export data to a comma-separated-variable (CSV) file. If your data includes commas, a tab-separated file is preferable.

First back up your existing file. Import the CSV or tabbed file into a word processor or spreadsheet and do a Search and Replace on the target numbers; then re-import as a new data file – ie make sure it's not simply appended to your old file.

You will have to take care to avoid unwanted changes. This can often be done by including tabs, commas and/or spaces in your Search and Replace strings – eg to distinguish an 0171 dialling code from an 0171 in the body of a non-London number.

Euro date

Another date to mark is New Year's Day 2002, by which time companies in countries that have signed up to the euro will have to ensure that their systems can cope with the euro.

Even if Britain does not actually join, any UK business that is trading with euro companies will also require basic conversion capabilities.

British companies will spend an estimated £7.6bn coping with the change, according to analysts IDC.

SMART SWITCHES

Multiple PCs made easy

Cybox has lent me a SwitchView (right), one of the simplest of the company's range of smart switches – it has transformed my desktop.

On my desk are two PCs: one workhorse and the other for trying out new software. I used to switch each to the same monitor as needed, and

confused myself over which mouse and keyboard to use.

This is not the case with SwitchView. It is called a KVM because it switches keyboard, video and mouse simultaneously: I need only one set for both machines, and I can control two notebooks from it as well.

The switch restricts itself

to machines which are on, so you can't switch to machines that are not there, as you would with a passive 'dumb' switch.

A two-PC version costs £124.55 (£106 ex VAT), and a four-PC one costs £183.30 (£156 ex VAT).

Most KVMs are used by administrators to control



servers

from a single desk; They get a lot

more powerful than SwitchView: the XP4040 (below left) can hold up to 14 switching modules and can be linked to others to create any switching environment.

Other Cybox modules allow remote switching and link with control and management modules to enable an administrator to work at any of hundreds of machines remotely.

CLIVE AKASS

www.cybox.ie



CYBEX'S XP4040 (LEFT) AND SWITCHVIEW (ABOVE) WILL SAVE YOU TIME AND FIDLING AND BOTH WILL QUICKLY MAKE THEMSELVES INDISPENSABLE

short stories

3G MOBILES FACE TRIAL

Vodafone and Nortel are planning a trial of third-generation (3G) mobile communications in London early this year.

Prototype devices to be tested include mobile phones with built-in MPEG4 video cameras, that are capable of transmitting and receiving data at rates of 64Kbits/sec.

There will also be wireless modems for laptop computers, and a mobile data device with speeds of up to 348Kbits/sec.

LIFE AFTER Y2K FOR GMT

You may have wondered what will happen to all the firms that have been working on the Y2K problem. One of the best known, Greenwich Mean Time, describes itself as a desktop-management software developer and, as if to escape the Y2K image, it has released an MP3 encoder, player and organiser called J-Box.

Karl Feilder, who heads the company, said this is the first of a planned series of Internet products. J-Box costs £29.95 inc VAT.

www.gmt-2000.com

HARDWARE

Adaptec drives SCSI forward

SCSI specialist Adaptec has released four Ultra160 host adaptors to cope with the latest superfast disk drives. They can pass a theoretical 160MB/sec, twice the bandwidth of previous LVD SCSI.

In fact they clock at exactly the same rate as Ultra2 but use both the rising and falling edge of the pulse to trigger twice the number of transitions on the data bus. The adaptors are backward-compatible with previous SCSI devices.

Wider SCSI bandwidths are necessary as data rates and drive speeds increase (14,000rpm is expected this year) and an increasing number of drives are clustered in RAID arrays.

Quantum, IBM, Western Digital and Seagate are all offering Ultra160 drives. We will be taking an in-depth look at some of the latest devices in our group test next month.

Ultra160 also replaces the parity error-checking used on previous versions of SCSI, with more reliable cyclic-redundancy checks. It also introduces domain

validation, which allows devices to negotiate the optimum transfer rate with their host, similar to the way a modem negotiates the best data rate a connection can sustain. In previous versions a connection can fail if it cannot sustain a data rate agreed between host and client device.

The entry-level Adaptec 19160 and 29160 Ultra160 adaptors, designed to support fast internal drives and slower external legacy devices, have a 50-pin external and 68-pin internal connector. They sit on a 32bit PCI bus and can support a maximum of 15 devices. The £194.99 19160 is designed for single-user workstations

and the £249.99 29160N is optimised for server use.

The £259.99 29160 and the £299.99 39160 are 64bit PCI devices with 68-pin connectors for internal and external devices. However, the 39160 includes a dual set of connectors, enabling it to support 30 devices. All prices are ex VAT.

www.adaptec.com;
www.ultra160-scsi.com



Games players wishing to compete from linked PCs are being offered an 'instant network' kit from Farallon.

The Battlepak kit costing £49.99 consists of a Starlet

hub and two 10BaseT network cables, but you have to buy your network interface cards separately.

Softline: 01372 726333
www.softline.co.uk

short stories

GREEN TONERS

A national charity plans to raise cash by recycling the estimated six million toner cartridges used each year in Britain.

The British Institute for Brain Injured Children (BIBIC) says half of these toners end up in landfill sites where they will take thousands of years to biodegrade.

'Abuse of our natural resources will impact on all our children for hundreds of years,' said organiser Erica Wheeler. BIBIC will also recycle used inkjet cartridges.

Hewlett-Packard has developed a smart toner cartridge that will tell you when it is running low or has not been installed correctly. It will also prevent rogue traders selling refilled cartridges as new, the company claims. A release date has yet to be announced. BIBIC 01278 684060 or email info@bibic.org.uk

ALL EYES ON ET

More than 1.5 million people worldwide have downloaded the screensaver that allows a PC to join the Search for ExtraTerrestrial Intelligence (SETI) scheme looking for life elsewhere in the universe. Spare processing capacity in participating computers is coordinated to create, in effect, a huge parallel computer, which has contributed 125 years of processing time to data from the Arecibo observatory in Puerto Rico. Version 2.0 of the screensaver is in the pipeline. setiathome.berkeley.edu

CUT-PRICE CALLS ARRIVE

Net2Phone, which offers cut-price PC-to-phone calls to more than 30 countries, has launched a phone-to-phone service in Britain. The service uses a private IP network. www.net2phone.com

LINUX

Web kit snubs Windows

Intel is to produce a range of web-access appliances designed, like the 'web companion' platform Microsoft unveiled last year at Comdex, to be leased or given away by service providers.

The difference is the boxes will run Linux rather than Windows – a boost for the open-source operating system. Web appliances offer service providers, banks and retailers the opportunity for new business models by providing customers with the means to access their services.

The first Intel-branded products, based on Intel's Celeron processor, will be available in mid-2000 and will integrate Internet access with telephony features such as call management and unified messaging.

The move is a blow for the prospects of Microsoft's Pocket PC software, formerly called Windows CE, which Microsoft targeted at just this type of device (see also Tim Bajarin's analysis, p38).

IDC analyst Peter Lemon said Microsoft must be

concerned because its 'bigger and better operating system' philosophy doesn't work for appliance operating systems.

An Intel spokesperson described Linux as the 'operating system of choice for customers', but said Intel would continue to support Windows and 'historically support multiple operating systems.'

Lemon believes Intel chose Linux because it is free. 'Intel can own the whole thing.'

ADDITIONAL REPORTING
LISA KELLY, VNUNET.COM

INTERNET PCS

Compaq toasts blue Presarios

Compaq is following its novel business-oriented iPaq systems (see *PCW*, February, p24) with a ground-breaking design for the consumer market. The Presario EZ-2000 range of Internet PCs come with a choice of Pentium III or Celeron processors and have a blue toaster-like box with

ports, bays and expansion slots covered by front (pictured) and rear lids.

They include a modem, two free PCI slots, and USB and 1394 ports as well as what Compaq describes as a



Digital Dashboard.

One of its tasks is to notify up to 10 users of any new mail.

US pricing begins at \$999.

MAC

Summer launch for MacOS X

Steve Jobs has unveiled the long-awaited MacOS X – and announced that he has finally taken a permanent job at Apple after more than a year as 'interim' chief executive.

Version X of the OS has a new user interface called Aqua and will be released this summer

Jobs, who rejoined Apple in 1997 after a 12-year break from the company he co-founded, announced his new status at the Macworld trade



show in San Francisco.

He also unveiled a redesigned Apple.com website with a range of services, including lists of safe websites for children, online data storage, email services, and online greeting cards. He

said the services are specifically designed for the latest operating system.

Apple is also investing £125m investment in US Internet service provider Earthlink, which Mac users will be encouraged to use as their primary connection.

Some analysts were not altogether happy at the news. Giga Information Group's Rob Enderle, said Jobs' job announcement was made to distract people from the fact the company hadn't brought out new hardware.

VNUNET.COM

CHIPS

Intel and AMD play beat the clock

Intel and AMD continued their duel over processor speeds with the release of 800MHz versions of their leading-edge processors. Intel also launched a 533MHz version of its low-end Celeron chip to compete with AMD's 533MHz K6-2.

Both companies face potential competition for these low-end chips from VIA, which bought WinChip developer IDT and Cyrix's MII technology last year. VIA plans to launch a 'PIII-class' Celeron clone early this year using the Socket 370.

Initial clock speeds are expected to be a relatively

slow 433MHz and 466MHz but the chips will boast a 133MHz front-side bus and 256KB of on-chip Level 2 cache, compared with the 66MHz bus and 128KB cache of current Celerons.

But smaller, faster Celerons are on the way with an imminent move to 0.18micron manufacture, according to Intel's desktop products vice-president Pat Gelsinger. Speeds of up to



633MHz are expected by the end of the year.

Intel was first to announce an 800MHz PIII in December and AMD unveiled an 800MHz Athlon at the Consumer Electronics Show two weeks later. Intel also launched a 750MHz PIII,

matching the previous fastest Athlon rate.

The new PIII launch had not been expected until well into 2000 but was brought forward to pre-empt the Athlons.

AMD and Intel are racing to be the first to bring a 1GHz chip to market. AMD showed

two Athlons clocking 900MHz at room temperature at CES.

The company also plans to introduce its Gemini technology, which uses voltage dropping and clock switching to save power, in much the same way as Intel's SpeedStep technology.

SYSTEMS

Start-up in new bid to beat Amiga jinx

The Amiga could live again following a deal with PC vendor Gateway, which bought the brand after the collapse of Commodore Business Machines in the US. Gateway has sold the name to start-up Amino Development, headed by former Gateway marketing executive Bill McEwen, for about £3m.

Gateway has done little to revive the machine which still has intensely loyal users. McEwen said: 'This is a very exciting day and now an even more exciting tomorrow. We can finish the job that was started 15 years ago.'

McEwen also purchased the rights to Amiga-related Internet domain names and

email addresses. But the deal does not include the transfer of Tom Schmidt, Amiga's president, or other staff. Gateway has also retained the 47 Amiga patents it acquired for about £8m.

However, buyers of Commodore salvage have not had a happy history so far. The Commodore name was

bought in the UK by Escom, which went belly up. It was then acquired by Tulip in Holland, which promptly came close to following suit (though it has since revived). And of course Commodore itself did a rescue job on the Amiga, only to file for bankruptcy in the US in 1994.

short stories

AD SITES SPRING UP

Rupert Murdoch will by no means have everything his own way with his new shopping sites (see main story, right). A new classified ads site has been set up by the people who built the car-trading website www.autotrader.co.uk. The site at www.adtrader.co.uk will include a virtual shopping centre as well as a claimed 250,000 classified ads.

Also recently launched is www.safestreet.co.uk, a shopping centre that incorporates more than 70 'stores', offering a wide range of products.



Traders can have their own store for £49.95 a month, plus one per cent commission on sales.

CUT OUT SPAM CALLS

You can prevent unsolicited telephone and fax calls by registering with preference schemes set up by the Direct



Marketing Association (0845 070 then 0707 for voice calls or

0702 for fax). Traders who fail to honour your privacy then risk a fine of up to £5,000. The www.NumberCheck.co.uk website allows you to check whether your number, or one you are calling, is registered.

OFFSHORE GAMBLE

Ladbrokes, facing competition from tax-free online betting shops based outside Britain, is setting up a telephone and Internet operation on the isle of Gibraltar. The website, which uses Orbis' OpenBet system, is expected to go live early this year. www.ladbrokes.com

INTERNET

Murdoch fires up web assault

Media mogul Rupert Murdoch has launched a fresh assault on the web with an auction site, set up under a newly-formed Internet division called News Network.

FiredUp.com shows how Murdoch's media empire can offer formidable competition to high-profile start-ups, which have made much of the early running in ecommerce.

It will sell a mix of showbiz merchandise and a variety of end-of-line bargains and other special offers from leading manufacturers, attracting visitors with a series of online events – all promoted by Murdoch titles like the *News of the World* and *The Sun* on a scale few start-ups could afford.

News Network, part of the



News International group, will not confine itself to down-market ventures. It will provide a common marketing and ecommerce infrastructure for a number of sites targeting different markets, including the readerships of Murdoch's heavyweights *The Times* and *The Sunday Times*.

However, the papers will

retain their own sites. Page3.com and The Bun, a portal and service provider originally launched as the online Sun, will continue as sister sites to FiredUp.com under News Network.

BSkyB, which is 40 per cent owned by News International, has taken a 10 per cent stake in the gameplay.com games portal and five per cent of toy vendor toyzone.co.uk, under new-media director John Swingewood. BSkyB's Internet strategy is independent of News Network, though there is some cross-promotion.

Old firms show their strength

The investment in Internet start-ups will slow down soon as venture capitalists get tired of the slow return rates – and online-only businesses will lose out to those that also have a bricks-and-mortar base, a San Francisco conference was told recently.

Richard Christner, VP at Mercer Management Consulting, cited Britain's Dixons as an example of a company that had used its brand and market position to promote its online sales.

'You will begin to see hybrid firms whose strength is

to enable links for returns and refunds [at their bricks and mortar stores],' he told the Next extravaganza conference.

Fellow Mercer consultant David Morrison said that traditional firms are the ones making money on the web.

LINDA LEUNG, VNUNET.COM

Dotcoms threatened by Act

Non-US firms could be fined over £60,000 for using their own name in 'dotcom' addresses, under a new law aimed at curbing cybersquatting, according to a leading Internet lawyer.

David Flint, technology specialist at MacRoberts solicitors, predicts that the US Anti-cybersquatting Consumer Protection Act will lead to foreign firms using local domains, which are not

subject to US law, rather than registering as a dotcom.

The Act was aimed mainly at those who buy up domains with the aim of selling them at a profit. US courts had previously ruled repeatedly against companies which argued that web addresses should not include anything similar to someone else's trademark. But, after fierce lobbying, the new Act reverses this position: offending site

owners face not only fines but also the potentially high cost of litigation.

The Act does not cover names registered up to 29 November 1999, and it is not clear how it will cover cases where the same trademark has different owners.

Flint described it as a very worrying turn, that gives US companies 'a substantial advantage in any dispute with a foreign domain registrant.'

MEMORY

RAMBUS set to hit the mainstream

The price of fast RAMBUS memory will fall to within 20 per cent above that of rival SDRAM by the end of this year, according to memory specialist Kingston Technology. Currently it costs between four and five times as much as SDRAM.

The credibility of RAMBUS technology took a big dent last year when glitches forced Intel to stall the launch of its supporting 820 chipset.

The hiccup boosted VIA's chipset, which supports PC133 memory and was seen as a short-term alternative to RAMBUS. VIA is also backing emerging Double Data Rate (DDR) SDRAM, which doubles the memory speed for a given clock rate by triggering on both the rising and falling edge of the pulse.

Kingston does not make memory chips but is the world's biggest producer of memory

modules – including RAMBUS rivals. European technical support manager Robert Allen said early versions of RAMBUS had been in use since 1995 in workstations.

The 820 chipset supports only two RAMBUS modules – the problems occurred when there were more. 'In a perfect world RAMBUS works fine,' said Allen.

'Three Kingston modules on an Intel [mother]board work fine. But when you have modules from different manufacturers on boards from a variety of manufacturers you get propagation problems.'

The problems can be overcome by rigorous testing and the four major memory makers are ready for production, said Allen. He predicted that NEC's Virtual Channel Memory would not take off. And he said

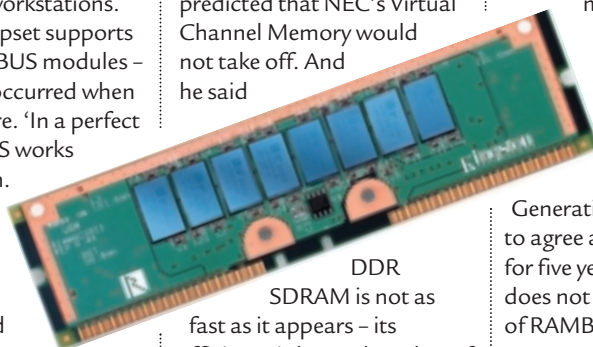
technologies as processor speeds soar. But in the short term there remain doubts whether mainstream users will pay a premium for a relatively marginal increase in memory speed.

Intel, under pressure from PC vendors, is hedging its bets.

It has formed a Next

Generation DRAM alliance to agree a memory platform for five years' time – its remit does not include discussion of RAMBUS.

Samsung – which stopped making the chips in the wake of the 820 chipset debacle – has a new 288MB Direct RAMBUS chip and says it is producing two million a month.



DDR SDRAM is not as fast as it appears – its efficiency is lower than that of RAMBUS because the proportion of misreads and miswrites is higher (see table).

Few dispute that RAMBUS has more headroom than rival

Comparative efficiency of rival memory platforms

	SDRAM	PC133	DDR SDRAM		Direct RAMBUS	
Frequency	100MHz	133MHz	200MHz	266MHz	600MHz	800MHz
Max bandwidth	800Mbits/sec	1Gbit/sec	1.6Gbits/sec	2.1Gbits/sec	1.2Gbits/sec	1.6Gbits/sec
Expected bandwidth	500Mbits/sec	600Mbits/sec	900Mbits/sec	1.2Gbits/sec	1.1Gbits/sec	1.5Gbits/sec
Efficiency	65 per cent	60 per cent	60 per cent	60 per cent	97 per cent	97 per cent

Source: Kingston Technology

WIRELESS

Bluetooth and IR will work side by side

Bluetooth wireless technology will not spell the end of infra-red for short-range data links, according to the executive director of the IR Data Association (IRDA).

Lawrence Faulkner said that infra-red and emerging Bluetooth wireless links will complement – rather than compete – with each other.

IRDA is showing signs of nerves over Bluetooth, which it admits may replace IR for many purposes. Faulkner said in a newsletter to members: 'It is vital that we understand and communicate our

strengths and that we quit apologising for what we are.'

One of those strengths, he said, is that you make an IR connection simply by pointing a device. Bluetooth has to find all devices in range and then pick from a list.

'I understand that it is possible for Bluetooth devices to recognise each other automatically once they have been set up to work together, but the first time will be cumbersome,' he wrote.

He says this makes IR much more useful for public data ports in airports, hotels,

and stores – any time you need to connect to a device that is not your own.'

IR also avoids the problem of interference, which could be acute in a typical office environment. 'The directed nature of IR allows users to control interference from external sources; controlling RF signals is like trying to herd cats,' he added.

Speed is another issue. IR now has a top throughput of 16Mbits/sec, compared with about 1Mbit/sec for Bluetooth. 'Not just the basic signalling rate, but the

prospect of sharing that bandwidth with other devices means that the throughput of an IR link should outperform Bluetooth by many times,' Faulkner said.

He concluded: 'We are not in competition with Bluetooth. We are in competition with ourselves and our own ability to effectively utilise this wonderful technology.'

Curiously he does not mention the security advantages of IR – unlike radio waves it does not travel through walls.

HANDHELDS

Pilots are winning the battle with CE-based handhelds, but Microsoft has a Rapier-sharp plan

Titans lay down battle plans

Three years ago I told Jeff Hawkins, father of the Palm Pilot, that he would sell one million of the devices in their first year. He laughed at the time, but my wild prediction was close to being correct.

But before you get the idea that I am a genius at predicting the future, I must also confess to having forecast that Microsoft would sell 300,000 units of its Windows CE-based handhelds in their first year; in fact they barely sold 150,000. There are now 6.5 million Palm Pilots in use, compared to around a million CE machines.

Everex and Philips have discontinued CE-based products, and Microsoft itself has dropped the name CE in favour of the phrase

customer and retailer complaints, and sales still can't keep pace with Palm.

Palm sales account for nearly 75 per cent of all personal digital devices sold, according to researchers International Data Corporation. Sales were expected to top one million over the Christmas period alone, followed by another four million over the coming year.

HP, Compaq and NEC have continued to support and sell CE-based devices, but sources close to all three companies suggest that they are also looking very closely at the Pilot as a possible alternative platform.

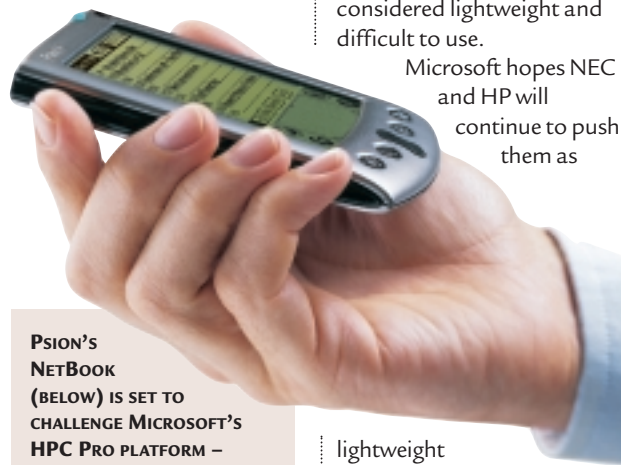
So, why has the Pilot been so successful while CE has been such a dismal failure? The answer

handheld devices.

Complaints have driven Microsoft back to the drawing board and I understand that the company now has a new Pilot-like interface, code-named

called CE (see page 18), which comes with pocket versions of Word, PowerPoint, Access, Excel and Outlook. These devices have also sold poorly as the pocket applications are considered lightweight and difficult to use.

Microsoft hopes NEC and HP will continue to push them as



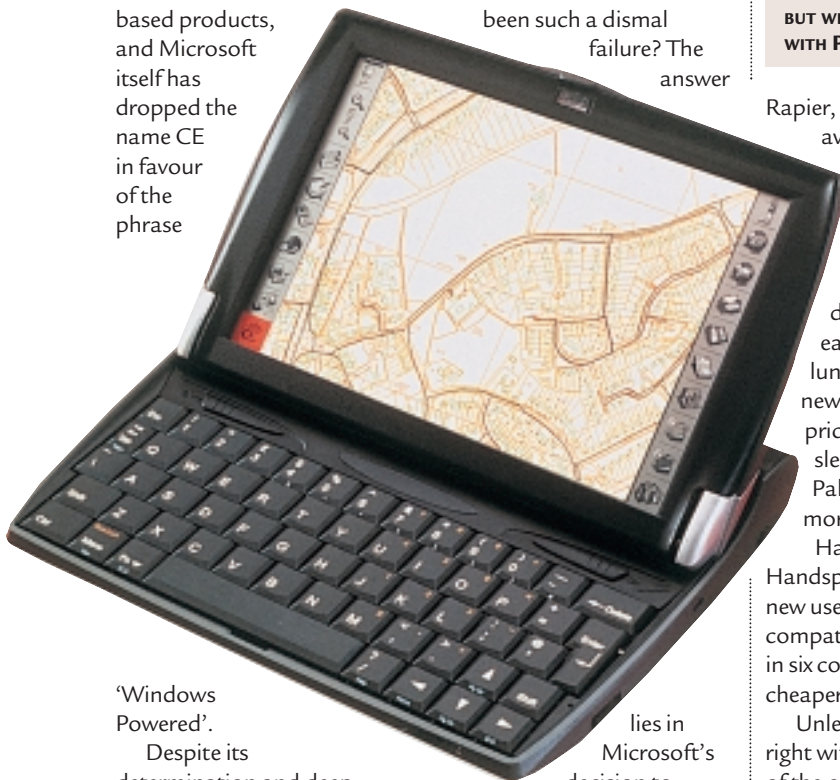
PSION'S NETBOOK (BELOW) IS SET TO CHALLENGE MICROSOFT'S HPC PRO PLATFORM – BUT WILL EITHER CATCH UP WITH PALM?

lightweight alternatives for mobile road warriors. A Palm OS equivalent has yet to appear but Psion's NetBook (marketed in the UK as a corporate version of the Series 7) is about to launch in the US and could provide strong competition. Its user interface is very simple to use and easy to learn. It comes with built-in apps that are file-compatible with Microsoft's Office applications and it has a battery life of close to 12 hours.

I got a chance to try one out at Fall Comdex last year and I am convinced that the 199MHz StrongArm-powered NetBook will give Microsoft's HPC Pro platform as much competition as smaller CE devices have had from Palm.

Microsoft clearly has an uphill battle ahead. Given Palm's long lead, it is highly unlikely that Microsoft will ever be the main player in this important new sector.

TIM BAJARIN



'Windows Powered'.

Despite its determination and deep pockets, Microsoft has been thwarted in its attempts to dominate the handheld market. CE has been adapted three times in response to

lies in Microsoft's decision to create a scaled-down version of the familiar Windows interface. This might work on a big screen, but it is difficult to transfer to small

Rapier, which should be available on next-generation handhelds in the spring.

Meanwhile, Palm Computing, the Pilot division of 3Com, is eating Microsoft's lunch. It has tempted new users with lower-priced models, while new sleek designs like the Palm V appeal to the more upscale users.

Hawkins' new venture, Handspring, is taking aim at new users with Palm-compatible models that come in six colours at prices even cheaper than most of Palm's.

Unless Microsoft gets it right with Rapier, the chances of the company gaining any ground on the Palm platform in 2000 is minimal.

Microsoft is also still pushing its Handheld PC Pro platform, based on what was

WIRELESS

Microsoft has entered the microbrowser arena with its Mobile Explorer platform

Raising a few I-browsers

It has finally happened: Microsoft has announced an Internet browser for mobile phones. The Microsoft Mobile Explorer (MME) platform consists of a dual-mode microbrowser, the Pocket PC operating system (aka Windows CE), with applications and server-side components.

Microsoft says this platform allows 'partners to pick the solution that best fits their needs, using one or more of the components'. One such partner is Ericsson, which is to supply its WAP (Wireless Application Protocol) stack to Microsoft and will adopt the Mobile Explorer for its handsets.

WAP and the Wireless Markup Language (WML) are designed to deliver Internet-based content over mobile networks to devices with

limited displays. Content providers must reformat information to WML, and end users need a WAP-compliant device with a microbrowser. While WML supports graphics, most content will be limited to text headlines and options for delivering news, sport, banking and other applications.

In the early days of microbrowsing, Microsoft was conspicuous by its absence from the WAP forum. Nokia and Ericsson were to write their own microbrowsers. Just about everyone else was going to license Phone.com's

software: Motorola uses it in its WAP-compliant tri-band mobile. Nokia is still reeling with the demand for its long-awaited 7110 which uses the company's microbrowser.

Ericsson may use Microsoft's microbrowser and server components, but it

The other version, for smart phones, supports more sophisticated messaging and PIM applications to run on higher-resolution PDAs with built-in mobile comms.

Considering that Microsoft has always aggressively pushed its OSs, and wanted

what kind of device should they be using for mobile applications? Should it be a mobile phone with extended facilities, or a PDA with cellular comms? Mobile phones are certainly more familiar, but suffer from small mono screens, while no-one really wants to hold a Psion 5 to their ear.

The radio Bluetooth technology (that Microsoft and Ericsson are developing) may have the answer (see also feature page 130). Nowadays many mobile users leave their phone in a bag or pocket and use a wired headset. But imagine a future PDA with cellular and Bluetooth capabilities. Again, it sits in your pocket or on a desk, but you make voice calls using a wireless headset over a short-range Bluetooth connection. Ericsson has already shown such a headset (far left), designed for use on its T28 (left) and R320 mobiles that works up to 10 metres away. Alternatively, you could have a PDA-sized Bluetooth screen, to extend your phone's display capabilities.

WAP offers a great solution for delivering content to basic mobile displays over slow 9,600bits/sec networks, but no-one knows if such stripped-down material will set the public's imagination on fire. There's also the question of how many people would re-author their content to WML. WAP solves problems that will go away soon: within 12 to 18 months, mobile data will increase to at least 384Kbits/sec, and we should have Bluetooth solutions sooner. Mobile Internet will be big, but whether WAP will be a long-term partner is another matter.

GORDON LAING



ERICSSON'S WIRELESS BLUETOOTH HEADSET (LEFT) CAN BE USED UP TO 10 METRES AWAY FROM ITS T28 PHONES (ABOVE)

CE to be the standard on mobile phones, this dual strategy is a quite mature move. On the one hand there's the

OS-independent microbrowser option for basic data-capable mobile phones which Ericsson has plumped for, and on the other is a more sophisticated suite for larger devices that will more than likely be running CE.

Microsoft will still pitch CE against devices such as the Psion 5, but looks as if it may give up on pushing more than its microbrowser to the feature-phone market. The Ericsson deal could result in a Symbian PDA running Microsoft's browser under Psion's EPOC32 OS.

All interesting stuff, but the big question for users is

is not interested in the Windows CE portions of the MME platform, and won't let the deal affect the Symbian alliance with Nokia, Motorola and Psion.

Microsoft has two implementations of MME. The first, for feature phones, is an 'operating system-independent, air-link agnostic browser-based solution that enables secure corporate or personal access to email, personal information manager (PIM) data and the Internet. It includes the first dual-mode microbrowser that can display HTML - and WAP 1.1-authored content'.

Lychee bears fruit for evolving web

Next-generation websites will have to generate pages suitable for new access devices like phones, PDAs and TV as well as the PC. For this reason Cambridge-based Netcentric Systems is among a handful of UK start-ups that have been backed by business angel Bob Williams, the former Unipalm chief executive who, with Peter Dawe, launched pioneer UK service provider Pipex.

Netcentric, founded three years ago by Jane and Keith Garrett, has developed a web content management system called Lychee, that provides a cost-effective way of maintaining a dynamic web presence. It uses eXtended Markup Language (XML) for content storage and delivery, and allows you to administer sites from a remote browser.

Williams believes many UK companies approach their websites in the wrong way. '[Sites] should be part of an integrated marketing programme,' he said. 'A good web designer is unlikely to be a good marketing person and vice versa. Lychee excels as it is able to bridge this gap. It enables a site to be designed

TeamAdvantage builds on Workbench's TeamWise (see screenshot), which lets team members capture information about their tasks using a drag-and-drop interface and allows leaders to develop a clear work structure that can be accessed by each member.

Investor Bob Williams

Task	Start	End	Est	ACT
Apache Systems Ltd				
Workbench Plan				
Survey				
Product Analysis				
Plan Preparation				
Final Presentation				
Product Culture				
Review Plan				
Apache Systems Ltd				
Concept				
Review				
Develop				
Test				
Deploy				
Support				

believes team-management software 'will be hot news in the next five years'.

professionally to provide the right corporate image and then to be passed over to a marketing team.

'For the first time the person who knows what they want to achieve with the website has the tools to interact with it. They don't have to go through a third person,' he added.

Lychee has been designed for non-technical users and its appeal lies in separating design from content, says Jane Garrett. IT personnel can use its powerful management tools, while keeping content owners happy with a simple, powerful user interface.

Lychee stores content in an object database from US-based Objectivity, providing a

Java-based interface for input and retrieval. It can run on 90 per cent of web servers using Linux, Unix or NT.

At around £45,000 for an unrestricted licence, Lychee is aimed at medium-to-large companies, but single-user licences will sell to small companies for less than £7,000. 'We are still defining our markets,' said Jane Garrett. 'But ultimately we expect these to include ISPs.'

Williams' investments via Counterpoint are tied to management contracts to provide all-round support. Others include:

- Datasieve, a spin-off from

the University of East Anglia, is doing sophisticated MPEG4 image manipulation.

• NetCall, already trading on the Alternative Investment Market and covered last year in this column. Its technology lets a customer make a free phone call to a vendor by clicking a web icon.

• Workbench Software, where directors Andy Race and Adrian Moore develop time-management software.

Its TeamAdvantage (see box) captures information about tasks, time and budgets and provides a co-operative environment for projects.

'Teams have their own dynamics and it is important that all members have visibility of the key objectives,' said Moore. 'TeamAdvantage lets team members give feedback with very little effort and this information can be harnessed to produce long-term radical improvements in processes,' he added.

www.workbenchsoftware.com
www.netcentricsystems.net
www.datasieve.com
www.netcallplc.com

Caroline Swift



reports from Silicon Fen

net shorts

BRIT BROWSER

AltaVista is the latest search engine to open a UK-oriented site. In addition to extended multimedia search facilities



there will be news feeds from Reuters and *Sporting Life*.

Searches can be done within any of five categories: UK-only, global, images (above), audio and video. Users can also make use of the Babel Fish multi-lingual translation service and can set password-protected filters to prevent children accessing unsuitable material.

AltaVista CEO Rod Schrock claimed it is 'the fastest and most comprehensive web search service designed for British users'. www.altavista.co.uk

SEARCH 'N' SAVE

A new site claims it can save



UK users up to 35 per cent on the price of a CD using its comparative shopping

engine. The site at www.clickmusic.co.uk searches music commerce sites to find the best prices. It claims it could have got you December's top 10 albums for £96.30 – compared to £132.90 at OurPrice.

CARTOON LOVERS

You don't need to go away to cultivate a holiday romance or make friends. www.dobedo.co.uk sets up chat sites in cartoon tropical locations.

PRIVACY

Nyms cover tracks of surfers

Web surfers will be able to cover their tracks and maintain complete anonymity using software called Freedom, its Canadian developers claim.

Freedom allows users to send email, chat and use newsgroups using any number of untraceable pseudonyms or 'nyms'.

The system developed by Zero Knowledge Systems (ZKS) encrypts and re-routes

Internet traffic through a network of 150 Freedom servers, each of which erases source information, including the IP address and identity of the sender.

ZKS' president Austin Hill revealed that the company's ultimate aim is to manage and control the disclosure of personal information on behalf of both consumers and businesses.

The company's chief

scientist, Ian Goldberg, said: 'Freedom will correct many of the Internet's privacy deficiencies by empowering users to control who gets access to their personal information.'

Freedom will be available to a maximum of 100,000 users in mid-February for £31.22 from www.freedom.net. A 30-day free trial version is available for download. www.zeroknowledge.com

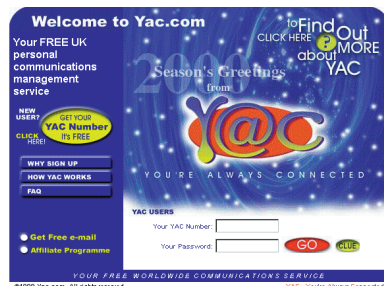
TELECOMS

'Free' number keeps track of you

A comms company is offering an Internet-based global telephone number for voice, voicemail, fax and email completely free – although callers to the number will pay mobile phone rates.

Calls to the number can be redirected virtually anywhere in the world and the users can administer the YAC.com service from any browser.

Callers also get an option to leave a voice message, which is delivered to an email



although parts of the service are offered by rival schemes, none offers the equivalent of the full YAC service – certainly not 'free'.

Chairman Mike Feerick says it offers a new level of flexibility. 'The service is totally

address of your choice. So are any faxes sent to your YAC number. You can register for a number simply by accessing the site at www.yac.com.

The company says that

independent of any communications device, Internet service provider or voicemail system. It brings control to personal communication.'

One foot in the web

New retirement homes for the elderly may be fitted with Internet access as standard following the success of a pilot scheme.

Builder McCarthy & Stone, which specialises in retirement homes, installed Internet-enabled PCs at some of its properties in Dorset and Hampshire. Residents aged up to 90 were so enthusiastic that the company may extend the scheme to homes

throughout the country.

NTL provided free access for the pilot and Bournemouth University helped teach the elderly users how to surf the Internet.

Lecturer Frances Cambrook admitted that she was astonished at



how quickly the residents managed to pick it up.

net shorts

COMPAQ'S NET STINGER

Compaq has licensed a version of the Be operating system called Stinger, for use in Internet appliances.

The two companies are also working on joint development and sales initiatives. But a Compaq spokeswoman said the deal did not 'guarantee that we will use its OS'.

Compaq has said the market for Internet appliances could be 'in the millions and millions'. At Comdex Be showed prototype access boxes using its software and is producing a version for NatSemi's Webpad.

Rob Enderle, an analyst at Giga Information Group, pointed out that Compaq cross-licenses pretty much everything. 'The question is are they going to ship anything? This is good PR for Be but you can't eat PR.' Stinger includes a browser and supports popular streaming audio and video standards.

DEALERS SIDESTEPED

Compaq is offering many products online at dealer prices, in a bid to win back business from online vendor Dell.

The move will force many dealers to find other suppliers. Other dealers will become subcontractors, assembling PCs to order and delivering them within 24 hours.

Andy Brown, IDC analyst, said: 'The move was inevitable but may have been a bit hasty. This will make or break Compaq.'

Steve Palmer vnunet.com

TALKING EMAIL

Customers of service provider Pipex can use a new free service to ring up and hear their email read over an ordinary telephone. They simply dial a special number and enter their SpeechMail account details.

PROCESSORS

Alpha gets £250m boost

Compaq and Samsung are pumping £250m into the research, development and marketing of the Alpha processor.

The Alpha, which Compaq inherited with its takeover of Digital, has long been the dark horse of computing. It is used mainly in high-end machines – but has the potential to break into the desktop market.

Compaq has signed a memorandum of understanding with Samsung and Alpha Processor Inc (API)

to invest £250m jointly under the new deal. Samsung owns 87 per cent of API, the Alpha manufacturing and marketing unit, and Compaq owns the rest.

Total additional investments in Alpha could approach £1bn over the next five years. The deal involves API possibly supplying low-end workstations and servers to Compaq, and expanding Alpha into thin servers, network appliances and comms infrastructure devices.

There will be partnerships with software developers, such as Cygnus, to develop open-source tools to boost the number of Linux-based Alpha applications.

Alpha sales actually increased in the third quarter of 1999, according to IDC, despite the cancellation of a project to put Windows 2000 on the processor. Up to seven per cent of Alpha sales are said to be for the Linux platform.

JONATHAN LAMBETH
[VNUNET.COM](http://vnunet.com)

OPERATING SYSTEMS

Linux makes a move on IA-64

Four leading Linux distributors are joining the Trillian project to port the operating system to Intel's forthcoming 64bit Itanium processor. Red Hat, Caldera, SuSE and TurboLinux will join HP, IBM, Intel and VA Linux Systems on the project, which aims to have the code ready for distribution by the time the first Itanium ships – probably late this year.

Peter Lemon, senior analyst at IDC, said that Linux distributors are becoming 'proper grown-up companies. They need a firm road map to offer investors'.

He added: 'A consortium such as Trillian shows that Itanium will be the default platform for the next five to 10 years. Everybody has to be there or be nowhere.'

Lemon believes Trillian is

an attempt to prevent what happened to Unix: 'When people started to use it, it fragmented fast.'

Benoy Tamang, VP of marketing for Caldera Systems, said: 'A Linux-enabled IA-64 architecture will allow our electronic service providers to create ebusiness solutions for high-end performance platforms.'

LISA KELLY, [VNUNET.COM](http://vnunet.com)

Four-in-one mic arrives

Believe it or not, this is a PC microphone. The LVA-7280 ClearVoice Digital Array is one of an emerging breed of so-called far-field mics – desktop models that are designed to match the performance of headsets when used with speech-recognition software.

The LVA-7280 is actually four mics in one: an on-board DSP chip uses subtle timing differences to



distinguish background noise from speech. The £99 (inc VAT) device, available on 1 April, also checks ambient noise when switched on and subtracts it from the signal.

It's on the large side for a crowded desk, but manufacturer Labtec says versions of it may be incorporated into system boxes and monitors.
www.labtec.com

short stories

▶ VIRUS CREATOR FACES JAIL

A computer programmer who admitted creating and letting one of the first-ever viruses into the wild is due to be sentenced in February.

David Smith pleaded guilty to two charges related to the Melissa virus, which sent itself to the first 50 names in a victim's address book. Melissa carried no malicious payload, other than a list of porn sites, but it cost an estimated £56m in disruption of email systems across the world.

Some companies, including Microsoft, had to shut down their email systems to clear the virus. Smith told the court: 'I had no idea there would be such profound consequences.' He faces a maximum of five years in prison and a fine of over £150,000 under federal law, and 10 years and a fine of over £90,000 under state law.

▶ FIRST WEB OS ARRIVES

A US company has launched what it claims is the first entirely web-based operating system. MywebOS.com says that by using the Internet as the network it reduces maintenance costs, gives universal access to data and is similar to a thin-client architecture. One of the first packages to run under MywebOS is Hyperoffice 2000, an office suite that includes a web-based word processor, email client, calendar, and contact manager.

▶ AVG 6.0 FOR FREE

Directions is giving away its anti-virus product AVG 6.0, which can also be updated free on the web. It will scan files (including Zips) and removable disks on demand as well as on access and it also protects email.

www.directions.ltd.uk

SHARES

Online dealing health warning

A huge explosion in online share dealing is worrying City authorities. Call centres and other systems used by brokers were overwhelmed when trading levels doubled in the space of a few weeks. The increase was triggered partly by Channel 4's share-tipping programme *Show Me The Money*.

Some brokers reported a three- or four-fold increase in trading. Watchdog the Financial Services Authority (FSA) warned new investors that they could get badly burned – particularly if they are putting their money into small, new high-tech companies that can be subject to volatile price movements.

One risk is that investors' money becomes tied up in stocks that are very difficult to sell.

But the FSA said brokers

should also take care to build an infrastructure capable of coping with peaks in demand and it threatened to curb trading of those who failed to do so.

In the US what is called 'day trading' has moved dealing in stocks and shares out of traditional institutions and into homes across the country. Many people give up their jobs to sit at home, trying to make money out of minute-by-minute fluctuations in share prices.

The dangers were highlighted last July when a man killed himself, his family, and nine people at two day-trading firms after losing around £300,000.

The FSA has posted a warning on its website for people considering going into day trading. It points out that unless you have expensive access to real-time changes in

prices, you will be at a disadvantage compared to the professionals.

The warning goes on: 'Day trading is a stressful full-time job. It involves serious concentration and steady nerves. To spot market trends day traders must watch quotes and price fluctuations continuously.'

A 0.5 per cent stamp duty on transactions has to be offset against gains from marginal price fluctuations.

The FSA also warns that traders need sufficient resources to be able to exit fast if necessary. 'The whole market can move very rapidly and professional dealers may well be ahead.'

Investors are also advised to call the FSA's Central Register on 0845 606 1234 to check whether they are using an authorised dealer. www.sib.co.uk

ONLINE BANKING

Failure on the cards for ebanks

Many of the 30 banks that are expected to launch online in Europe this year will fail because their business model is flawed, a management expert has warned.

Durlacher Research consultant David Pannell said most will be the Internet arms of 'bricks and mortar' banks, trying to defend their existing business rather than exploiting the potential of the medium for financial services.

Online financial offerings are convenient but lack new value propositions to differentiate them from rivals. 'Tailoring accounts to the needs of the individual is vital.

THE PRUDENTIAL'S ONLINE BANKING ARM EGG WAS HIT BY SWAMPED SERVERS AND SECURITY PROBLEMS LAST YEAR. OTHER ONLINE BANKS COULD HAVE MORE FUNDAMENTAL PROBLEMS

or four accounts, he said.

Pannell believes that portals will lead the market, often in

partnerships with banks like that between Yahoo and NatWest. Wireless Application Protocol (WAP) service providers may also apply for banking licences. 'The explosion of WAP usage will enable a new range of mobile data and mobile commerce applications,' he said.

LISA KELLY, VUNET.COM

Few are moving towards personalisation or building communities,' he told the e-Financial Services Forum.

Pannell said a web-only bank costs about £20m to build and lacks the advantage of links into branches.

Customer loyalty will be poor because people will experiment and try out three

Gordon Laing looks at the **consumer benefits** of the age of the application service provider.

Rent-a-host



While I love consumer electronics, my IT *nous* sort of peaks around what the industry refers to as the small to medium enterprise – you know, the thing we used to call small office/home office before it got serious. That's all very

well, but there's a whole world out there called proper Enterprise, packed full of technologies and jargon I've never even heard of. OK, I'll occasionally put up with my management consultant friends bandying around terms such as enterprise-wide solutions, but in general, anyone who uses the word leverage, or worse, and pronounces it in the North American way, has lost me.

Which is why Application Service Providers seemed to come out of nowhere, and to be honest, kind of caught me off-guard. Apparently, say my enterprise-wide friends, they've been there all along. That may be true for those big businesses, but I was stunned to realise they could transform the way small to medium businesses

Microsoft's president Steve Balmer said MS would become an online software service provider **WITHIN FIVE TO SEVEN YEARS**

work, even down to single-user installations like myself.

Here's the plan, and it's so cunning you could pin a tail on it and call it a fox. You currently buy expensive computers so you can run the latest software, right? You also regularly upgrade software to the latest versions – after all, you don't want to be left behind. So far, so expensive, but what about the total cost of ownership? You know, the time it takes to install the upgrades, make sure they work, and more crucially keep them working. What about the hassles of data loss and backing up? It's hard enough keeping your systems afloat as an individual, but when there's 10, 50 or even more people in your company, the deployment of a software upgrade becomes a task of mammoth proportions.

So why not let someone else worry about it? I'm not talking about hiring an MIS department though. How about using Application Service Providers, ASPs, to rent you time on their software over the Internet. They buy the constantly evolving PC hardware, install the latest

application updates, look after all your data and keep it working 24 hours a day. Essentially you let them do all the expensive hard work, while you reap the benefits by renting familiar powerful services using extremely modest devices. Of course you'll need quick, secure Internet connections, but these should hopefully become increasingly common throughout 2000.

If it sounds like the big servers and dumb terminals of long ago, you'd not be far wrong. The difference is that instead of green screens, we'll have our graphically rich desktops, and the server won't be accessed across a locally owned network, but the Internet. It makes complete sense. If you only use, say, PowerPoint twice a year, then why buy and install it, when you could execute it remotely an hour at a time? It's the pay as you go model that's working so well for mobile phones. Also, why worry about locally backing up data, when it's secure offsite in the first place?

So could we soon be renting Office 2000 rather than buying it? Almost certainly. Microsoft's president Steve Balmer said MS would become an online software service provider within five to seven years. MS is already working with BT to pilot remote UK services. US customers of Office 2000 can access additional online services such as language translation and directories.

Don't take my word for it: research from the likes of Forrester claims that the market for leased applications will grow from next to nothing to £4bn annually by 2001. Chances are you're even using ASPs right now. HotMail is a perfect example, where the software is executed and messages stored entirely remotely; Excite will even look after your schedule and contacts. You may currently find HotMail and Excite slow even over quick Internet connections, but remember they're free so long as you don't mind a bit of advertising. Imagine how the quality of service could improve with a rented model.

Microsoft and Intel have done a good job in the past decade of putting a PC on every desk, but ASPs may offer compelling reasons to think differently. As a PC enthusiast, I'll of course still find an excuse to buy unnecessarily fast hardware. Then again, after spending an entire weekend reinstalling my operating systems, applications and documents after a particularly nasty failure, I'm beginning to think that outsourcing my applications and data sounds like a lot less hassle.

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Barry Fox worries that **ill-defined standards** let industry giants pursue their interests, not yours.

Trouble standards



We rejoice when, to our surprise, something in the Windows world actually works as promised, but complain bitterly when an audio or video system falls over. We are used to the guaranteed plug and playability that comes from

tight standards on disc, tape, radio and TV.

The DVD Forum was set up to control the new Movie and ROM formats. But the 1,000-page DVD standard was hurriedly agreed by companies (Toshiba, Time Warner, Hitachi and Panasonic) that have never created or policed standards. We are now seeing the unhappy results.

The Matrix is the first mass-market DVD to contain branch codes that provide different levels of interaction on a PC and home DVD player. However, the codes confuse some players and some PCs, so the disc may not play. The interactive software comes from PC Friendly and its website catalogues the extent of the problem which hit consumers in the US (<http://pcfriendly.com>).

Players from Sony, Samsung, GE/Thomson, Toshiba and Pioneer all suffered. The manufacturers have had to pay for modifications, usually a new firmware EPROM.

As soon as the US problems emerged I asked Warner in the UK and Warner's head office in Burbank what steps had been taken to ensure a smoother launch in Europe. Burbank promised a comment, but despite my reminders and Burbank's assurances, I heard nothing of substance. Warner UK now says 70,000 copies sold here in the first week and any problems are because 'the disc is too sophisticated for lower-end, cheap hardware that does not have the capacity to play such enhanced material. There are not actually any problems with the disc itself'.

But Thomson, which owns GE and RCA in America, has employed independent technical consultants that say the US *Matrix* was outside the DVD specification in one key area, the 'menu.VOB' file structure. Placement of the 'Video Zone TS directory' and 'UDF file lengths' were also abnormal.

Similar compatibility problems are now emerging in Europe. My Dell PIII PC refuses to run the disc under the PC Friendly software. After warnings from *Something About Mary* (which uses similar interactive branching) Samsung is spending around £500,000 changing chips in the 50,000-60,000 players it has sold in Europe over

the past year or so. Without the mod, the players refuse to play the disc. Woolworths and Comet are worried about their Proline players. Comet does not stock the disc, telling customers it has been withdrawn as faulty.

Says Samsung: 'DVD hardware was out there before these discs. Why didn't Warner check?'

Expect similar problems with a modification to the CD system due soon. The object is to stop people making digital copies of music CDs.

This spoilsport system was developed by British company C-Dilla, now owned by Macrovision, the US giant that provides the analog anti-copy system used for VHS tapes, DVD movie discs and satellite pay-per-view. C-Dilla has for many years encrypted CD-ROMs to prevent unauthorised use or copying and recently found it could modify the bit stream on a music CD so that it plays on a CD player, but not on a PC CD-ROM drive.

False error correction codes stop the disc playing on a ROM drive, or dual-deck music CD copier which, by design, refuses to copy a ROM. Added flags also fool a CD player into muting the SP/DIF digital output. So the music content cannot be digitally copied. It sounds too good, or more accurately too bad, to be true. But I tried a test pressing and it worked; the music played on a consumer music CD player but not on a PC drive.

The 1,000-page DVD STANDARD WAS HURRIEDLY AGREED by companies that have never created or policed standards

Macrovision has recently teamed up with TTR Technologies to test the system on a wide range of CD players, PC ROM drives and DVD players. The current plan is to offer the system (provisionally called AudioLock) to the record companies for commercial launch in summer this year. The record companies hate recordable CDs so much that there are bound to be plenty of takers.

But the industry-backed Secure Digital Music Initiative (SDMI), acknowledges that people want to 'rip' CDs from ROM drive to hard disc. So SDMI concentrates on controlling further copying. Now AudioLock will stop ripping.

That's the effect of messing with a standard.

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Bargain-hunting software will **overcome shoppers' other ecommerce fears**, says Brian Clegg.

Triple agents



You can't watch the news these days without being reminded of ecommerce. The web is ever-present, whether today's hot topic is yet another teenage web millionaire, or the closure of bank branches because of online servicing. As a reader of

PCW, you are probably in the vanguard of those who are comfortable doing business on the web, but for many customers it's a frightening exercise. There's uncertainty attached to black-box shopping, not helped by dark stories of security problems and hackers. Ecommerce needs a killer application, the sweetener to bring in customers in their millions. And I think it's on the way.

Let's look at two recent ecommerce offerings. The first is a bookshop – no, don't yawn. I know that thanks to Amazon, books are already the most popular purchases on the web, but this is no ordinary online bookshop; BookBrain (www.bookbrain.co.uk) doesn't exactly sell books. Using the Whittaker's catalogue, a monthly CD-ROM of every book in print in the UK,

Ecommerce needs a KILLER APPLICATION, the sweetener to bring in customers in their millions. And I think it's on the way

BookBrain pinpoints the book of your choice. Then it contacts the UK online shops. From each it finds price, availability and shipping costs. Now you've an instant comparison. And the differences aren't trivial. You can usually save two or three pounds, while it's not unusual for savings to mount into double figures on an expensive purchase. Then it's just a click to the usual purchasing options.

BookBrain is that rare delight – added value that actually saves money. At the moment it only covers books, but the technology behind BookBrain can easily be applied to other online shopping areas, probably starting with music and DVD. As the owners of BookBrain point out, what they're offering is not just a cost saving. By bringing other information into the equation, the site gives an unbiased comparison of suppliers. So you can make a quick, informed decision.

A related product aimed at business customers is

Sprinter. Developed by Tranmit (www.tranmit.co.uk) this software sits between a corporate's purchasing system and the web catalogues of its suppliers. When the company wants to buy 10,000 blue ballpoint pens, the system can search product databases and supplier CD catalogues to find the cheapest goods available, pulling back a list in price order. Another module of Sprinter then provides the in-house purchasing system with a way to place the order on the supplier's website, overcoming the complexities of a thousand different shopping carts.

This might not seem a big deal if you don't work for a large company, but those who are used to corporate life will be familiar with purchasing frustration. You see the product you want in WidgiSales' online catalogue, but you can't buy it, because your company's procedures require a form 34B filled out in triplicate and signed by your boss. WidgiSales knows nothing about form 34B – it wants hard cash (or at least your flexible friend). With Sprinter you still use an electronic form 34B, but as soon as your boss presses the Go button, the system interfaces with the WidgiSales site and your order's on the way.

What's emerging here is the next piece in the intelligent agent jigsaw. In a recent column about Apple I mentioned Knowledge Navigator, John Sculley's imaginary trip into the future of computing. Knowledge Navigator featured an intelligent agent, a talking head and shoulders on the computer screen. The agent acted as the user's go-between, translating spoken human requests into a myriad of electronic transactions, then pulling together the results.

One component of the agent already exists – products to (semi-intelligently) search the web. But BookBrain and Sprinter take things one stage further. They don't just search, they undertake actions for you. They're electronic middlemen without the middleman's cut. Within 10 years I think the Knowledge Navigator agent will be here – but not quite as Apple envisaged it. Instead of doing everything, it will just be a front man. There's nothing IT people like better than software that works in three layers; it seems to verge on a natural law. The shoppers of the future may well ask an electronic replica of their favourite film star to find them a book on skiing, but that front-end agent will then act through middleware agents – and they've already arrived.

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David Fearon argues that **umbrella domain names** aren't even worth the registration fee.

Money for nothing



I'll avoid making some kind of pun along the lines of 'what's in a name?' because they've all been done to death in recent months. But writing this a couple of weeks after the sale of the Internet domain

business.com for £4.7m, I just

have to add my own opinions to the fray.

Business.com, bought by a company called Ebusiness, is to be used as a portal for a range of business services, and the justification for the huge cash outlay is that the usual cost of establishing a brand name is bypassed. But branding consultant Allen Adamson is quoted in the *New York Times* as saying that there's little future in this type of generic, catch-all domain name, and I agree. Paying that kind of money for a single domain makes you wonder if any of the investors putting up the money for Internet-related ventures actually use the web on a day-to-day basis.

If you're looking for information on a particular topic, the quickest way to find what you want is often

You're less likely to HIT A RED HERRING if you enter a well-known brand name URL: large companies bring trademark lawyers to bear

not a search engine, but domain surfing. Enter a sensible-sounding URL for the chosen subject into your browser's address field and you'll likely find what you're looking for after one or two attempts. I do it all the time: looking at my browser's history list now I can see opengl.org, vrml.org and usb.org, all excellent resources. But in the list there are precious few entries of that sort for commercial .com sites – intel.com and microsoft.com are there, but processors.com and software.com aren't. If you've ever dabbled with something like book-buying online, did you type www.books.com or did you head straight to the brand names you know, in other words amazon.com or, after the recent TV ad push, bol.com?

Specific branding is a resource worth defending. A couple of years back, www.altavista.com sent you to a site that, I seem to recall, produced email greetings card software – the 'real' Altavista search engine was at

www.altavista.digital.com. Compaq, having acquired DEC, subsequently shelled out a reported £2.1m for altavista.com in August 1998. I'd call that a sensible move – Compaq was protecting a valuable, specific brand. Ebusiness has paid twice that figure for a word that doesn't mean anything very much.

It only costs about £45 to register a domain name for two years – you can do it online via any number of ISPs. If you're going for a .com, once you've applied for the name through your chosen third party you'll get an invoice via email from Network Solutions in the US. From there you can hop across to the secure server and pay for it online. It's as easy as ordering a book from Amazon, which is why every generic .com domain you can possibly think of has been snapped up either by individuals, ISPs or domain-trading companies.

Try it yourself: think of the most obscure commercial activity you can, head over to www.internic.net and do a whois query on thatsubject.com. In the hope of making easy money, crazypaving.com, doubleglazing.com and every other daft generic domain has already been registered. The frustrating part is that only a tiny

percentage of these are actually attached to real sites; most just contain placeholders advertising the fact that the domain is for sale. Even when you do hit a live one, it's likely to be a company you've never heard of, operating from the most inconvenient physical location possible.

Information can travel at the speed of light from a server in America, but a chap from plumbing.com might take a little while longer to make the trip from Middletown, New York to fix your leaky tap. All this means that anyone with any experience in web use tends to avoid domain surfing with generic .com domains. You're far less likely to hit a red herring if you enter a well-known brand name URL: large companies swiftly bring their trademark lawyers to bear on domain speculators who try to acquire brand name domains. It's those couple of saved surfing seconds that will lead to generic domains languishing under the shadow of established brands.

Aside from those domains in the news, very few of them actually change hands for significant amounts of money. The upshot of most domain speculation is simply to clog up the web and make those very domains practically worthless in the long term.

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letters

Send your letters to:
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BILL'S BASIC MISTAKE

Have I read this wrong (Microsoft fights piracy by withholding media, PCW January 2000, page 24)? Surely it's not 1 April yet. I always thought that the requirement for original discs to be supplied with a new computer was so basic that everyone took it for granted. Obviously it's something that Microsoft finds it convenient to forget about (along with decent manuals, but that's another story).

I'm not a computer novice by any means but there have been innumerable occasions when I've had to go back to the original discs: something I've installed has corrupted something else; the machine has crashed and corrupted something; I've uninstalled something I thought I wouldn't need and found I did; I've decided to have a clear-out of all the clutter left by dead programs so have reformatted the hard drive and done a fresh install; I've bought a new hard drive and decided to start from scratch with a fresh install.

My current machine came with a Microsoft Windows 95 CD together with a system recovery CD and disk from the

manufacturer. Obviously the system recovery option is OK, but I've always been glad of (and preferred) the Microsoft Windows 95 CD. As for the idea of a 'BIOS-locked recovery disk' what about BIOS upgrades, viruses etc? Obviously these are not something we all encounter every day, but they're not exactly unheard of.

ROBERT STUBBS

WHAT NO MEDIA?

So now, when we buy a PC with a Windows OS, we won't get a copy of the OS on a disc as part of the bundle. If that's what 'discontinuing media as part of required deliverables' means.

The vague offer of a BIOS-locked recovery disc, which only works with a BIOS carrying the vendor's ID, shows how little Microsoft cares or understands.

Operating systems, even those from Microsoft, quite often outlast the hardware. So what happens when I change my PC? Microsoft seems to be denying me the freedom to remove the OS from the old machine, and install it on the new one.

What happens when I change the

LETTER OF THE MONTH

AOL'S HIDDEN COSTS

Readers might like to know about a back-door increase in charges for AOL's 0800 access plan. [Instead of charging for telephone calls to a LoCall number, this plan offers access at 1p a minute.]

While I generally welcome the thrust of this plan, it has a problem. If you also access AOL via TCP/IP [through a company network, for example], as I need to do from time to time, you are charged 1p per minute. When I was previously on the LoCall number access plan, TCP/IP access was offered at no additional charge – as it should be because I am paying my subscription fees for AOL access.

AOL does post a dialog box on the

subject of connecting via TCP/IP, but its thrust is more 'look at the great opportunity you are missing to connect via the 0800 number', rather than 'WARNING: despite being connected via TCP/IP you are still being charged 1p per minute'.

Indeed, AOL also states under keyword PRICING 'While you are connected to AOL on our 0800 access number, no charges will appear on your phone bill. Instead your AOL account will be billed at a rate of 1p per minute, allowing you to connect at less than local call rates, 24 hours a day.'

This implies that the 1p a minute charge will only apply while you are connected under the 0800 number.

I have written twice to AOL on this subject; the first response merely restated the issue rather than explaining and clarifying it; the second suggested that 'In relation to this particular query, can I please ask that you contact our customer services department... and we will gladly assist you in setting up a direct debit.' No, I didn't get the connection there either!

AOL is claiming to be at the forefront of the campaign to lower Internet access costs and obtain 'flat rate' access charges. But then it goes and raises the cost for those accessing by a 'flat rate' means!

BOB GEORGE

motherboard? Must I buy that from the original vendor, so it has the right ID? What happens if that vendor doesn't sell motherboards, or goes bust? How do we get the old ID onto the new motherboard?

Vendors are apparently unhappy about the plan, pointing out that reducing the availability of 'media' is quite likely to increase the incidence of piracy.

Nor will they be very thrilled when people like me start ordering PCs without Windows pre-installed, and demanding the appropriate reduction in price. We can either move our old Windows OS onto our new machine, or buy a separate copy of the OS on 'media'.

Microsoft attempts to justify its partly-baked proposal, with the completely eccentric argument that software piracy costs jobs, increases taxes and finances the drug trade. The implication that Microsoft can do anything to reduce unemployment, lower taxes and fight drug trafficking is stretching things, to say the least. That it proposes to bring us these benefits by reducing the availability of its software is at best ironic, at worst an indication of how very ill they have all become.

ROGER CAREY

APPLE'S LURID LEGACY

I wish Steve Jobs a long, healthy and prosperous life. But, when the time eventually comes for him to relocate to the 'Great Backup in the Sky', I hope he makes the journey in a translucent purple coffin for what he's unleashed upon the world.

OK, beige is boring, but have you walked around a PC retailer lately? Translucent printers, scanners, monitors, mice - even waste bins and plant-pot holders! Too much, too much! And what do these things look like when they've sucked in a bit of dust and gathered a few scratches?

IAN BARNES

WILL HEAD replies >

While we fully agree that the current crop of multicoloured PCs is a little hard on the eyes, it is hardly fair to blame Apple. The iMac is wonderfully designed and puts the beige box fraternity to shame, but the reason it works so well is that all its components are designed by Apple and as a result they co-ordinate. The PC industry was founded on the basis that you could choose your bits from a number of manufacturers and put together the best system for your needs. This worked fine

when everything was dirty white, but now we are experiencing the downside of this advantage - severe colour clash.

We've seen a few 'EasyPCs' recently and early indications would show that if anything in the PC domain can carry off the colours it will be these. As they are sold as sealed boxes there is less scope for adding bits that don't match. Hopefully, over time the style-conscious consumer will opt for the fun and friendly 'EasyPC' while those who want bang for their bucks can choose a powerful upgradable system that doesn't look too much like a mismatched eyesore.



GOT ANY CHANGE?

PCW is normally at the forefront of technological changes and usually ready to adopt or try out the latest new thing. So how come the latest phone number change seems to have escaped unnoticed? I know you've mentioned it in your news and reviews but the magazine hasn't adopted any. The letters page itself says 'Send your letters to... or fax 0171 316 9313'. Surely by now this should be 020 7316 9313. Page 10 (January 2000 issue) includes lots more examples.

But what happens when your advertisers try to do the right thing? One supplier's ad says phone 'Sales 0208 xxx xxx'. I'm sure this should be written 020 8xxx xxxx. Inside London you can skip the 020 prefix but you will need to add the 8 or you won't make the call.

Come 1 April, everybody will have to be getting it right.

ROD M MAIN

WILL HEAD replies >

Due to the way the number change has been (mis)managed there is no ideal time to switch over to the new numbers. Until autumn 2000 (specific dates depend on the actual code) you can use either the new codes with the new numbers or the old codes with the old numbers. However, the new local numbers on their own do not come into effect

until 22 April (at approximately 1am). Although it is correct to present the number as 020 7316 9000, it is slightly misleading since dialling 7316 9000 in Central London before the 22 April will connect you to the wrong number (731 6900 if it exists). If you want to play safe then you should ideally change all numbers at 1am on the 22 April, but this isn't a viable option for most businesses. For more information on the intricacies of this problem see www.numberchange.org.

DOWNSIDE OF DOWNLOADS

I am currently working in Bangladesh, where Internet access speeds are slow (typically 10-40KB/min). Can I make a plea for websites with simple content that downloads quickly?

I have found many websites impossibly slow to browse from here because the graphics content is so great that a single page can take five minutes to download. I suspect many site designers are unaware of this problem. Anyone hoping to attract a wider audience needs to keep page size in mind. I suspect part of the blame lies with the website design software, which makes it easy to generate complex pages. Your review of website design packages in the December 1999 issue gives no clues as to whether some packages create bulkier pages than others.

JOHN RATSEY

SERVICE WITH A SMILE

I recently purchased a 17in CTX monitor. When I installed it on my computer I found that it was impossible for me to obtain a straight top or sides to the desktop. I tried all of the controls to no avail. There was another problem, in that the plastic edging around the screen was out of alignment.

I telephoned CTX at Watford to explain my difficulties. I spoke to a very helpful lady who decided that the best idea was to replace the monitor. She told me the exchange would take place on the following Tuesday morning (three days later). At 9am on the specified day the exchange was made.

A great deal of your correspondence relates to bad service from suppliers and manufacturers in the computer industry. I therefore felt that it would be right to publicise an example of excellent service. As a result I am writing to you in the hope that others may realise all is not lost and some companies will look after their customers.

GEORGE FARMER

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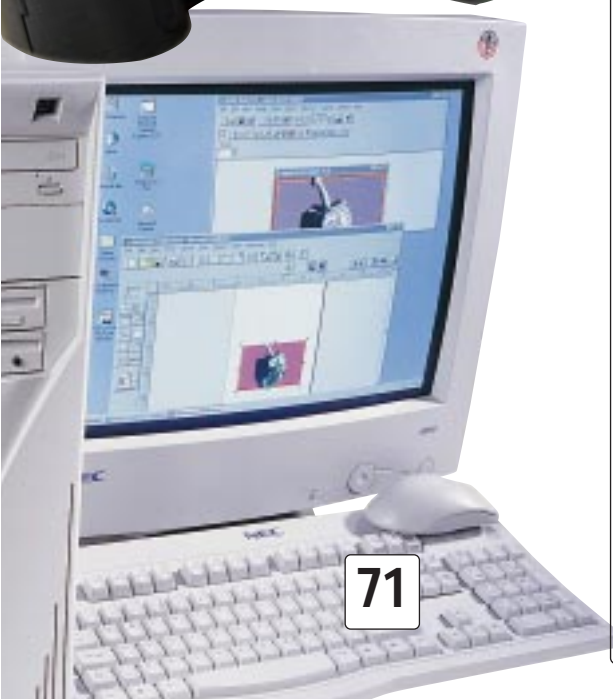
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Nik Rawlinson
DEPUTY EDITOR

No longer a flight of fancy

I remember it once being said that a PC could only be considered 'IBM compatible' if it was able to run Microsoft Flight Simulator. Whether that is true or not I can't say, but it is an interesting place to start thinking about the way that the market has turned almost full circle in the past five to 10 years.

When I was growing up, I had several computers, starting with an Amstrad CPC464 (I was a late developer) with integrated tape drive, and moving on to a PCW, Amstrad's green-screened word-processing computer with 3in disks, still popular with many writers today I'm told. I eventually graduated to a 286. As soon as I got it home and fired up DOS 4.01 on the 12in mono screen, I realised that what I had was approaching the height of technology. But there was a dent in my new happiness – it was the thought of having to discard my precious software collection because it would not run on this new format. At least when I got as far as the 286 I could console myself with the thought that the next time I upgraded I would be able to take my software with me.

Today, users are less likely to buy a new machine than to upgrade a single component – a new motherboard, faster processor or extra memory, safe in the knowledge that it will make existing software faster, not obsolete. A good thing? Yes, but whereas you once threw out your software to upgrade your machine, you now often throw out your machine, or parts of it, to upgrade your software. The launch of Windows 95 did more than any other software release to boost the sales of hard drives and memory as users frantically upgraded their hardware to cope with this new resource-hungry operating system.

Now with the release of Windows 2000 nothing has changed. Not only might you have to upgrade your hard

drive to accommodate the 2GB of elbow room the OS might demand, but there is a chance that your existing graphics cards and so on might no longer work.

Worse still, the release of updated drivers could be delayed still further as Microsoft insists that they are shipped to its test bed for certification before being stamped with a Windows 2000-approved signature. Of course, you can still install non-approved drivers, but it's your problem if anything goes wrong. In itself, this is a 'Good Thing'. We can finally be sure that drivers will always be compatible with the OS, but at the same time, Microsoft has built a software application that will dictate the hills and valleys of the future hardware landscape.

You now throw out your machine, or part of it, to upgrade your software

Microsoft could use this as the ideal opportunity to give away at least the 'Professional' edition of

Windows 2000, intended as the next step for users of NT4 Workstation, and make its money solely from charging peripheral manufacturers a fee for driver validation. The peripheral vendors would probably pass this ratification cost on to the end users – a form of direct taxation, if you like – but we would all benefit from a free operating system.

Microsoft would be a winner, too, extending its market share even further and in turn encouraging users to adopt other Microsoft products. It is a model that could work. I asked Corel's Kylee McKay why her company was spending money developing a first-class Linux distribution that it would then give away for free.

Her answer was simple: you want to drive on the motorway for free but you are more than happy to pay for a car. In other words, give users the means to run your programs for free and they will be more likely to buy them.

I emailed my idea to billg@microsoft.com – I'll let you know if I get a reply.

NIK_RAWLINSON@VNU.CO.UK



**VNU
European
Labs**

VNU Labs tests all kinds of hardware and software, from PCs and modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 98 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Ratings

- ★★★★★ EXCELLENT
- ★★★★☆ VERY GOOD
- ★★★☆☆ AVERAGE
- ★★☆☆☆ BELOW AVERAGE
- ★☆☆☆☆ POOR

Sony Vaio C1XN

Small but perfectly formed, this laptop contains everything a truly mobile user could ever need.

The introduction of the Vaio C1 last year heralded a huge step forward in both design and functionality. Amid a never-ending stream of Windows CE machines, Sony produced a near pocket-sized model that ran full Windows 98 and had one unique feature, but more about that later.

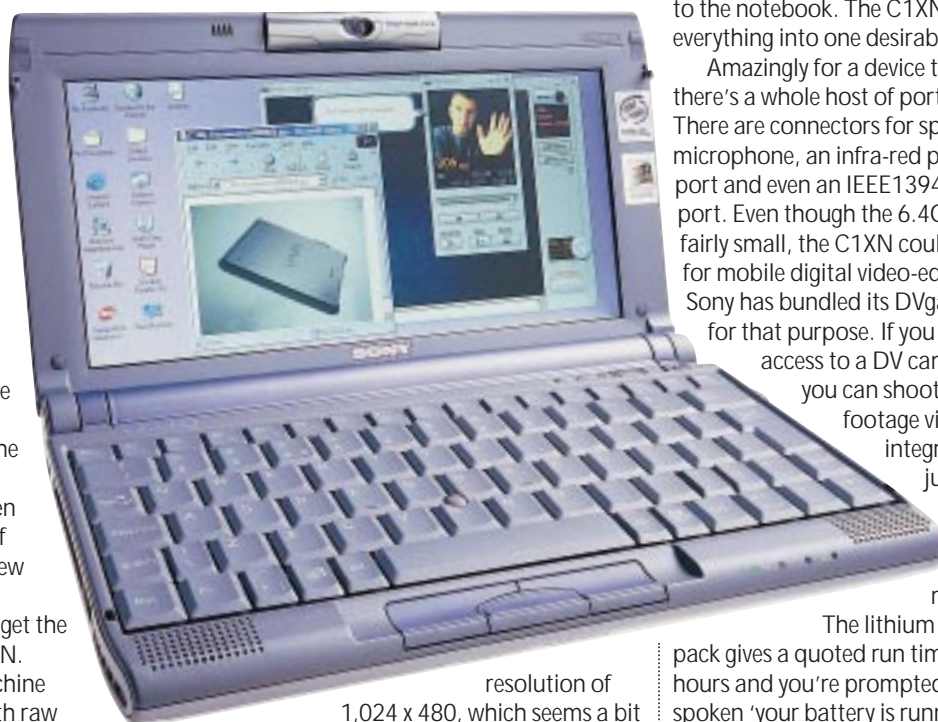
The C1XN represents the second-generation C1 product and sports some specification enhancements over its predecessor. The most obvious change is a switch to a Celeron CPU from the previous Pentium MMX processor. Even with a clock speed of only 266MHz, the new chip is more than powerful enough to get the most out of the C1XN.

Users of this machine aren't concerned with raw power, it is the portability and feature set of the machines that are paramount. Complementing the CPU is 64MB of memory and a 6.4GB hard disk. Again these are not cutting edge as far as notebook technology goes, but well up to the kind of task for which a machine of this type will be used.

The major concern with a device of this size is the ergonomics. Thankfully Sony has come up trumps with the C1 range and despite its diminutive dimensions, the keyboard is excellent. It does take a bit of getting used to, but once you're accustomed to the reduced key sizes a fast rate of typing can be achieved easily. The nib is also very responsive, making pointer manipulation simple and accurate. An added input feature is the jog dial on the right-hand side of the unit. This allows you to scroll through

options and select by pressing the dial inwards.

Due to the overall shape of the machine, the screen adopts a ratio not too dissimilar to that of a widescreen TV. The 8.9in TFT display supports a



resolution of 1,024 x 480, which seems a bit odd at first, but you soon get used to it. The important thing is that you can easily display the entire width of documents, but you obviously don't get as much vertical space as a standard ratio screen. The quality of the display is superb with the lighting dispersed evenly across the surface and crystal-clear focus.

Even though the C1XN makes a great pocket notebook computer, one of its major selling points has nothing to do with PC technology. Integrated into the lid of the

unit is a rotating digital camera. It doesn't offer the best-quality results available with a maximum resolution of 640 x 480, but it takes the functionality of the C1XN into a new dimension. A unit like this would be a godsend to people like estate agents, insurance assessors or even surveyors. Anyone who

has to write reports when away from the office and needs photographic reference will love one of these beauties. Even using a traditional digital camera for such jobs results in carrying two units and then having to transfer the pictures to the notebook. The C1XN bundles everything into one desirable package.

Amazingly for a device this small, there's a whole host of ports available. There are connectors for speakers and a microphone, an infra-red port, a USB port and even an IEEE1394 (FireWire) port. Even though the 6.4GB hard disk is fairly small, the C1XN could still be used for mobile digital video-editing and Sony has bundled its DVgate software for that purpose. If you don't have access to a DV camcorder, then

you can shoot digital footage via the integrated camera, just don't expect Oscar-winning results.

The lithium ion battery pack gives a quoted run time of two hours and you're prompted with a spoken 'your battery is running low' message as it nears rundown.

Weighing in at only 1kg, the C1XN is a highly desirable portable PC with some excellent features. If you need a pocket-sized Windows 98 computer, the C1XN could be just what you're looking for.

RIYAD EMERAN

A unit like this would be a godsend to people like insurance assessors

PCW DETAILS



★★★★★

Price £1,702.57
(£1,449 ex VAT)

Contact Sony 0990 424 424
www.sony.co.uk

Good points Small and perfectly formed, digital camera

Bad points May be too small for some

Conclusion A fantastic machine for the true mobile user

PERFORMANCE RESULTS



HP OmniBook 900

An excellent choice if you need a huge amount of power.

The OmniBook range has been around for ages now, and has grown into several product families. The 900 series takes up the mantle in the ultra-portable stakes, with the range split into three specifications. The unit we had on review is the most feature-packed version.

Although the original OmniBook range included some exceedingly tiny models, the 900 teeters on the edge of qualification for the sub-notebook title. At 305mm wide by 237mm deep, and just 34mm high with the lid closed, it's very small but slightly bulkier than the majority of ultra-portable contenders such as the Sharp PC-A280 (see *PCW* December 1999, p81) or Sony's magnificent Vaio 505X (see *PCW* January 2000, p75). Weighing in at a shade under 2Kg, it's also slightly heavier, but not by much.

With its diminutive form, the 900 has no integrated drives: both CD-ROM (oddly not included as standard) and floppy drive slot into an external drive housing. This connects to and is powered by a single, fairly inflexible cable that attaches to the side of the main unit. It's hot-pluggable, but swapping the floppy for the CD-ROM drive or vice versa in one session confused the unit and caused it to lock up.

It may not be the smallest ultra-portable around at the moment, but the OmniBook can legitimately lay claim to being the most powerful. At the heart of the system lies a mobile Pentium III processor purring along at 500MHz. This is actually more powerful than most desktop 500MHz units, since the mobile variant's 256KB of full-speed on-die Level 2 cache is only available on the desktop with newer Coppermine CPUs.

Backing up the PIII is 64MB of RAM, expandable to 192MB, and a large 12GB IBM Travelstar hard disk. Graphics are handled by ATI's new Mobility AGP 2x chipset, with 4MB of RAM and proper OpenGL support. The graphics chipset drives a 13.3in TFT screen, with a native resolution of 1,024 x 768. As is usual these days, the screen is bright and pin-sharp, with a good viewing angle.

One area that often distinguishes a decent notebook from cheaper impostors is the keyboard, and HP has

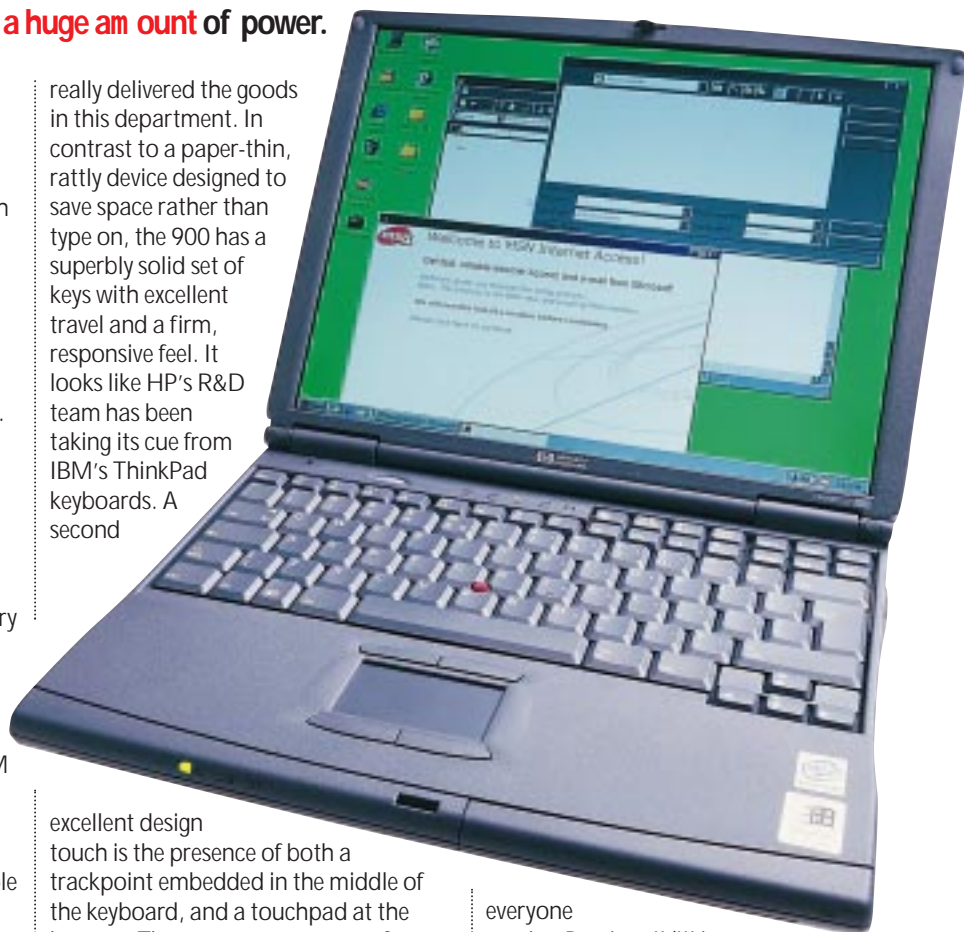
really delivered the goods in this department. In contrast to a paper-thin, rattly device designed to save space rather than type on, the 900 has a superbly solid set of keys with excellent travel and a firm, responsive feel. It looks like HP's R&D team has been taking its cue from IBM's ThinkPad keyboards. A second

excellent design touch is the presence of both a trackpoint embedded in the middle of the keyboard, and a touchpad at the bottom. There are even two sets of buttons to complement them.

The rest of the unit's specifications are fairly standard, with one parallel, one serial and one USB port, plus VGA out and a docking connector at the back. On the right-hand edge there are two PC Card slots, and the left-hand side accommodates the audio connectors and a PS/2 port.

Considering the processor speed, the OmniBook does quite well in the battery life stakes, with the lithium ion power pack providing an hour and 25 minutes with all power management disabled. You can expect roughly twice that figure in normal use.

HP's designers have obviously done their homework, and the culmination is a notebook that successfully treads the line between portability and having a case big enough to accommodate a decent keyboard and screen. The only problem with the machine is its specifications: Sony's Vaio 505X provides all the power and panache most ultra-portable users will need, at a far lower price than the OmniBook. In falling for Intel's line that



everyone needs a Pentium II/III in their machines, HP has risked pricing itself out of the market.

If you really need a 500MHz PIII and 12GB of storage when you're on the road, then the OmniBook gets a big thumbs-up. If you just need an email, spreadsheet and word-processing machine, get yourself a Sony instead.

DAVID FEARON

PCW DETAILS



Price £2,979 (£2,535 ex VAT)

Contact Hewlett-Packard 0990 474 747
www.hp.com/uk

Good points Loads of power stuffed into a very small case, great keyboard, has both trackpoint and touchpad

Bad points Sony is miles ahead in terms of executive chic, few people need this much power in a sub-notebook, CD-ROM drive an optional extra

Conclusion A well-designed product that comes with a cautious recommendation, but all that power commands a considerable premium

Lexon 702 Ultra

Packs a powerful punch and has plenty of space for expansion.

Buying direct from the manufacturer usually ensures that you get cutting-edge technology inside your PC and the 702 Ultra from Lexon does nothing to dispel this belief. This is one of the first PCs we've seen that uses Intel's new Flip Chip Pentium III processor, based on the 0.18micron manufacturing process, codenamed Coppermine.

The Ultra uses a 600MHz version of the Flip Chip. This looks a lot like Intel's budget Celeron processors, forsaking the Slot 1 design usually associated with the PIII. The benefits of this new type of chip are four-fold: they require less power to make them run; they run cooler than older processors; they can be pushed up to even faster speeds and, because of the way they are made, they are physically smaller. If you take a close look at the name of the processor inside the Ultra you will see that it is a 600MHz E PIII – the 'E' refers to the 0.18micron manufacturing process. One point to note is that while the Flip Chip may look just like a Celeron processor, because of the way the pins on the chip have been arranged, you won't be able to swap one for the other.

If you look inside this PC you will note that the motherboard is fitted with two processor connectors – the Celeron-style socket is filled by the Flip Chip, but there is also a Slot 1 free for you to add a regular slot-based PIII. The reason for this is that Intel is continuing to manufacture Slot 1 PIIIs at ever faster speeds, so Lexon is leaving your options open should you want to upgrade back to this type of chip at any time.

It is obvious that Lexon is looking to the future as the RAM installed can support the EB-suffixed chips, which can handle front-side bus speeds of up to 133MHz. Performance was as expected from a PC fitted with one of the fastest chips around – it managed a SYSmark score of 245 – slower than the 733MHz NEC but still a good performer. On the



downside, the 128MB of RAM has been provided on two separate 64MB DIMMs, filling two of the three slots. As this computer is quite obviously aimed at those users for whom future-proofing is paramount, it would have made more sense to fit all the RAM onto a single 128MB DIMM, leaving two slots free to upgrade.

The motherboard itself uses a pre-release version of the VIA 694 chipset. It is quite a small form factor board, but this is not reflected in the size of the case, as you still have to make do with a big beige box. However, with five free PCI slots, plus three 5.25in and one 3.5in bays available, you might be grateful for the extra internal space when it comes to adding new devices.

The AGP slot is filled by a 32MB Diamond V770 Ultra card that pulled in a 3DMark score of 5,483. This impressive graphics performance is complemented by a top-quality 17in Mitsubishi Diamondtron monitor that produces crystal-clear, pin-sharp images.

The Ultra comes with a six-speed DVD-ROM drive, but the only external storage is provided by a floppy drive. A CD-RW or Zip drive would have been a welcome extra, but at this price perhaps that would be greedy. There is also a

huge 34GB hard drive that should be able to satisfy most storage demands in any case. Bundled software is scant, but you do get a copy of Lotus SmartSuite Millennium alongside the Windows 98 SE operating system.

If you are looking for a computer with plenty of potential, the 702 Ultra could be the right choice for you. While it comes ready filled with the latest technology, there is plenty of scope for upgrades to keep up with future advances.

URSULA TOLAINI

PCW DETAILS



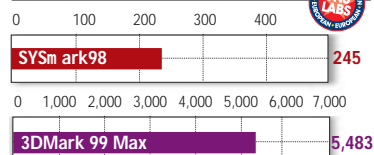
Price £1,174 (£999 ex VAT)
Contact Lexon 01442 241 700
www.lexonpc.com

Good points Innovative technology, lots of scope to upgrade

Bad points No backup storage device, large case despite small motherboard

Conclusion A powerful machine with room to expand

PERFORMANCE RESULTS



NEC Direction SM-733P

This machine contains **all the latest technology** at a price that could be just right for you.

Built around an 820 chipset, this speedy SM-733P machine from NEC Direct features what is currently Intel's flagship processor – the 0.18micron 733MHz Pentium III. The chipset supports a 133MHz front side bus and AGP 4X, of which NEC makes good use through the inclusion of the Guillemot 3D Prophet with 32MB on-board (see review, p80). Unfortunately it does not support PC133 RAM or RDRAM, so you'll have to upgrade the motherboard if you want to switch to this higher-speed memory in the future.

Apart from the rather ugly iMac-esque button, the most obvious feature on the face of this machine is the USB port, which is very welcome. It means you won't have to go scrambling around the back of your machine every time you want to plug in your digital camera. For more permanent installations, such as a USB mouse or a scanner, there is a second port to the rear of the machine.

Other front-facing features are a Pioneer DVD-ROM, floppy and Zip 250 drives, with a Zip 250 disk bundled to get you going. The 27GB Maxtor UDMA66 hard drive can be supplemented by further storage devices using the two free internal 3.5in bays.

Memory comes in the form of a single 256MB DIMM, leaving a second memory slot free for future use. This is not RDRAM, which is probably just as well because at current prices that might have made this machine unaffordable to many users.

Build quality is generally good, although the internal cables were a little untidy. Upgrades will be easy as the PCI cards are held in by a quick-release plastic plate. Unclip this from the system case and the cards can be lifted straight

out of the motherboard, saving you the effort of unscrewing each one.

Adhering to PC99 standards, the Intel CC820 motherboard has no ISA slots, sticking solely with PCI, of which three remain free, although one could be

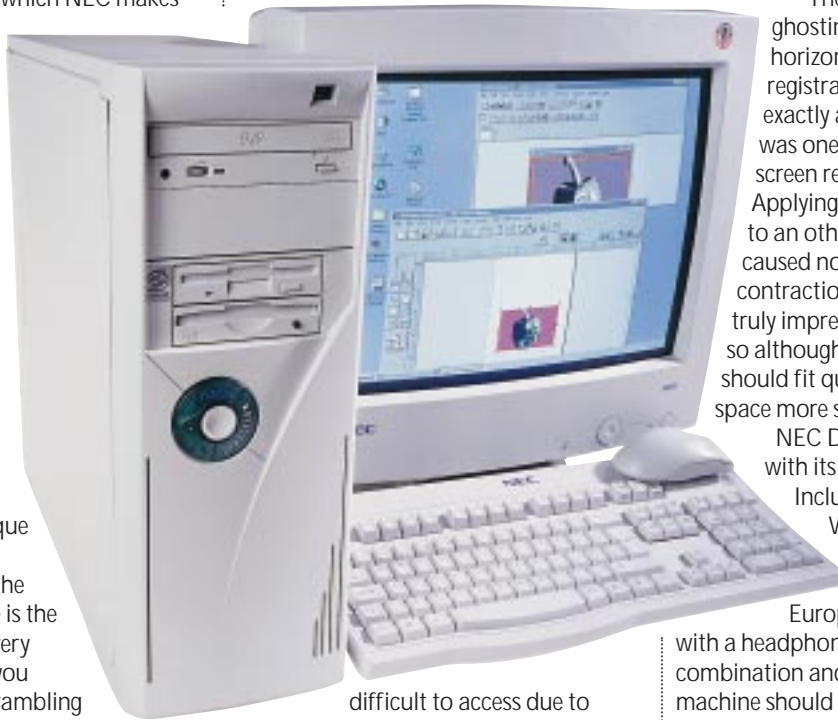
grey characters, there was slight blooming. Geometric and corner linearity was spot on, with all parallel lines running straight. Focus, too, could not be faulted, even at the traditionally difficult edges of the screen.

There was no streaking, ghosting or moiré, perfect horizontal and vertical colour registration with all guns firing exactly as they should, and this was one of the best examples of screen regulation we have seen. Applying a flashing white block to an otherwise black screen caused no expansion or contraction of the image, which is truly impressive. The tube is short, so although this is a 19in model it should fit quite comfortably into a space more suited to a 17in monitor.

NEC Direct has been generous with its software bundle, too.

Included are Microsoft Word 2000, Works, Money 99, Encarta 99. And Route 99 Europe and VIA Voice, along with a headphone/ microphone combination and Corel Draw 7, so this machine should have something to appeal to everyone.

NIK RAWLINSON



difficult to access due to the boxing on the modem in the slot above. You're unlikely to miss having ISA access any more unless you are heavily into home networking – an area that still boasts a healthy assortment of ISA peripherals.

NEC Direct has decided not to make use of the motherboard's modem riser capabilities, which is probably a good move, given the performance hit this will have on the processor and the relatively small number of AMR-compliant modems that are currently available.

The keyboard is not particularly responsive and we found the mouse less comfortable than Microsoft's wheel mouse, but a plus point was the chassis, which was designed for use as either a horizontal or a tower case.

The monitor was hard to fault. The OSD was well structured and easy to follow, and presented a wide range of tweaking options. The entire image had a uniform brightness, although when white characters were applied to a black background and compared to darker

PCW DETAILS



★★★★★

Price £1,937.58
(£1,649 ex VAT)

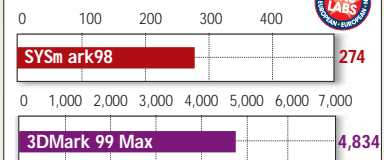
Contact NEC Direct 0870 010 6324
www.necdirect-europe.com

Good points Latest processor, chipset and graphics solution, good monitor, USB on front of case

Bad points Disappointing keyboard and mouse, poor choice of motherboard

Conclusion This is an impressive machine, making good use of new technology, presented at an affordable price

PERFORMANCE RESULTS



Nokia 7110e

The first WAP-enabled mobile may look green, but it's surprisingly mature.

Version 1.1 of the Wireless Application Protocol (WAP) promises to breathe new life into the world wide web, by bringing Internet content to cellular phones. Orange is the first of the mobile carriers to jump on the bandwagon, and through the Nokia 7110e handset it has brought an extremely attractive product to market.

The major problem with bringing the Internet to our pockets is how to present it in a readable format, while not sacrificing portability. And while the 7110e is slightly larger than the phones to which we have become accustomed, it is not uncomfortably so.

It features an over-sized screen that can hold up to five lines of text, and the content is navigated through a roller ball – the navi-roller. Other than this it is a standard phone, except for the spring-loaded keypad cover that brings images from the film *The Matrix* to mind.

But what about the Internet content itself? After selecting 'Services' from the standard menu, followed by 'Homepage' the phone dials the Orange WAP-optimised website, and logs on. It then presents you with a menu of online services. These include news supplied by ITN; sporting news supplied by the Press Association; entertainment listings; travel information and business directories. Selecting the news we were then taken to another page displaying a number of headlines, followed by a couple of lines of introduction on each of the stories.

Any one of these could then be selected to take you to a full, in-depth news article. All of the sections follow

this simple format, and while you won't find any fancy flash graphics the content is certainly functional.

From picking up the phone to actually reading one of the stories takes no more than a couple of minutes, but that could bloat your phone bill if you use the service a lot.

We were a bit frustrated by the number of times we experienced a 'connection failed' message. On a couple of occasions the phone refused point blank to access any of the services, even though we were in an area of full service. This could be because the main server had gone down, but whatever the reason it's not something the paying public should have to put up with.

The business directories section could prove to be of most use, as it provides huge amounts of information on businesses from all over the country. For example, we found the names, addresses and telephone numbers of five seafood restaurants in central London.

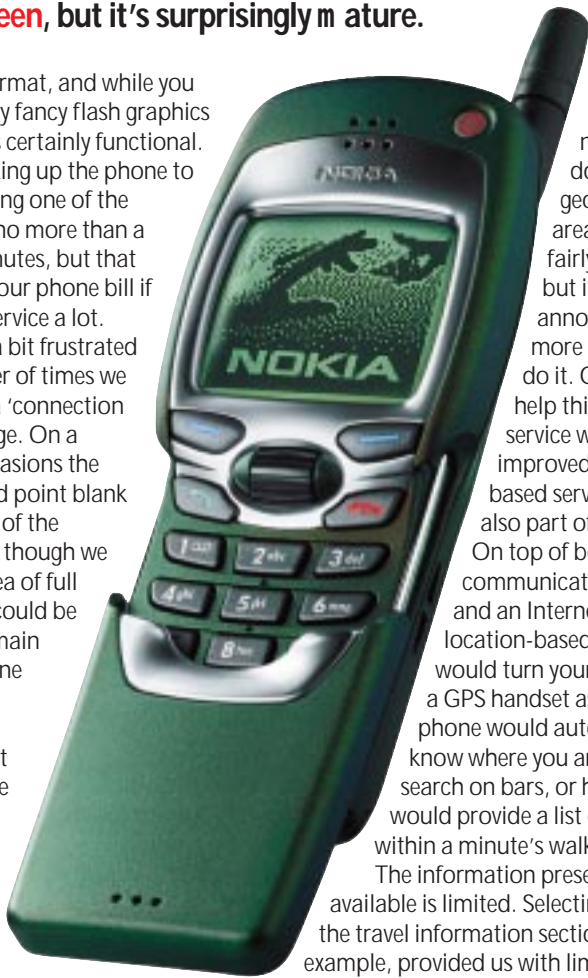
Accessing the directories takes a little more time, because as well as navigating through the pages we had to select

restaurant types and narrow down the geographical area. This is all fairly intuitive, but it can get annoying the more often you do it. One can't help thinking the service would be improved if location-based services were also part of WAP 1.1. On top of being a communications device and an Internet console, location-based services would turn your phone into a GPS handset as well. The phone would automatically know where you are so a search on bars, or hotels would provide a list of any within a minute's walk.

The information presently available is limited. Selecting 'trains' in the travel information section, for example, provided us with limited information on only four train operators.

This is only the first step along the road towards new mobile services. Third-generation (3G) mobile phones are still four or five years away – in the meantime Orange has provided a useful and attractive service. And for the first product to market, the Nokia 7110e seems mature and well developed.

DAVID RAE



WAP 1.1

The Wireless Application Protocol (WAP) is an Internet programming model optimised for handheld devices. It is based on the existing HTML model with a few succinct differences. It is designed to run within the constraints that handheld devices pose –

this includes the lack of a keyboard or mouse and a small viewing screen. The protocol used is known as the Wireless Markup Language (WML), which also adheres to all XML standards. This allows WML content to be accessed via standard

HTTP 1.1 requests from the WAP gateway. A number of networking companies have already jumped on the bandwagon and are providing WAP-enabled servers. This includes industry giants such as Lucent Technologies and Hewlett-Packard.

PCW DETAILS

★★★★

Price Phone £129.99 (£110.63 ex VAT), calls 5p a minute, WAP services free until 31 January 2000

Contact Orange services on Nokia 7110e handset 0800 80 10 80
www.orange.co.uk www.nokia.com

Good points Very useful, portable, fast
Bad points Some services still limited; the larger size might put people off; connection failed message a little too frequent

Conclusion While not yet fully mature the service is useful and attractive – and it makes a good party piece

Nikon CoolPIX 800

A fuller-featured brother to an award-winning sibling joins a formidable family.

Just two months after the CoolPIX 700 won our digital cameras group test, Nikon is back with its brand new CoolPIX 800, that looks virtually identical apart from the welcome inclusion of a 2x zoom. Fortunately, there's more to the 800 than meets the eye, and it sits between the 700 and 950 in Nikon's CoolPIX range.

All three members of the CoolPIX range are fitted with 2.11 megapixel 1/2in CCDs, operating at a maximum resolution of 1,600 x 1,200 pixels, which is sufficient to make an A4 inkjet print. Nikon supplies each with an 8MB CompactFlash card capable of storing eight, 16 or 32 high-resolution images at three levels of JPEG compression; an uncompressed mode produces 6MB TIFFs. There is also a 640 x 480 pixel mode available.

Lens-wise, there are clear differences between the three CoolPIX cameras; focal lengths are quoted in equivalent coverage to 35mm cameras. The 700 suffered from a fixed lens of 35mm (actually 6.5mm, f2.6), the 800 now boasts a 2x zoom of 38-76mm (actually 7-14mm, f3.5/4.8), while the 950 still wins with its 3x zoom of 38-115mm (actually 7-21mm, f2.4/4). Three optional lens attachments widen or shorten coverage. The minimum focusing distances of the 700, 800 and 950 are 9cm, 7cm and 2cm respectively. The 800 refines its autofocus with 480 steps compared to 127 on the 700, although the 950 boasts a 'stepless' 4,746.

When manually

focusing, the 800 has 45 steps compared to the 700's 10 steps.

Like Kodak, Nikon employs four AA batteries that are typically bigger, heavier, and shorter lasting than competitors' lithium ions, but they're readily available and much cheaper. Nikon throws in a set of alkalines to get you started while the supplied NiMHs (nickel metal hydrides) charge up. The 800, remarkably, squeezes more life out of its batteries than the 700, itself longer-lasting than the 950. You'll get around an hour and a half of general use, which isn't at all bad.

Anyone owning a Nikon 35mm SLR will recognise the CoolPIX's choice of three TTL metering modes: spot, centre-weighted and matrix. The latter, with 256 segments, is nigh-on impossible to fool and will convert any die-hard manual operator to the joys of auto-exposure. For that extra bit of input, however, you can compensate the exposure to plus or minus 2EV in 1/3 stop intervals. The 800 is also a tad more sensitive than the 700 and 950, rated at 100ASA compared to 80ASA.

Nikon fits its CoolPIX models with an innovative Best Shot Selector, BSS mode. This keeps taking photos while you hold the shutter (up to 10), analyses them and only saves the one with the most detail - great for tricky handheld shots. New to the 800 is a high-speed continuous shooting mode, which fires

off up to 40 320 x 240 pixel images at 30fps - handy for those somersaulting whales. A continuous 1.5fps mode is also available, along with five flash options, five white balance settings, and even digital brightness and contrast

adjustments. You can frame your shot with an optical viewfinder or the LCD screen - 1.8in on the 700 and 800, compared to the 950's 2in display - which actually looks much bigger in use. The 800's display indicates the shutter speed and aperture, but these are not manually adjustable.

Sadly, Nikon has not yet adopted USB and rubs salt in the wound by suggesting you buy a card reader for around £50. Kodak's USB connections go about 10 times faster than its serial ones, which is no consolation as you wait just over a minute for the 800 to download a typical JPEG. On the plus side, the software is simple to use, mounting the camera in My

Computer, allowing you to preview and drag image files onto your hard disk.

Whatever else you say about Nikon, it certainly knows how to take pictures. Images from the 800 (and previous CoolPIX models) simply cannot be faulted and are among the best of any digital camera we've tested. Slightly better in fact than the 2.3 megapixel chip on Fuji's MX-2900, although costing the same with a 3x zoom and 2in screen, this is the camera with which many will compare it. Kodak's DC280 with USB and a whopping 20MB memory card is also a contender. Like film cameras, the choice often boils down to personal preference and which suits the way you work. So saying, both were beaten by the CoolPIX 700 in our group test, and the fact that the 800 further improves on it is recommendation enough.

GORDON LAING



Images from the 800 are among the best of any digital camera

PCW DETAILS



Price £599 (£509.78 ex VAT)

Contact Nikon 0800 230 220

www.nikon.co.uk

Good points Great quality, features and handling

Bad points No standard USB connection

Conclusion One of the best cameras for the considerable £599 premium

Olympus Camedia C-2500L

A sturdy, solid digital SLR that sports high quality and style, but with a price tag to go with it.

This is one of the very few digital SLR cameras on the market. The two primary advantages of this are immediately obvious. First, it lets you see exactly what the camera sees, so you'll end up with the pictures you wanted, and second, because there's no need to use the LCD panel, you'll save juice on the batteries. From an aesthetic point of view, there's something inherently more satisfying about looking through the lens rather than at the display, and this is enhanced by the Camedia's shutter sound, giving the impression of it being a solid, reliable camera. Another innovation is offering the choice of either CompactFlash or SmartMedia storage in the same unit, and you can even use both at the same time for unbeatable capacity.

A small button to one side of the lens pops up an internal flash, while a hot shoe on the top will accept an independent flash unit, making this a versatile choice for the more professional user. Digital professionals should also be impressed by the output. We tested it under a number of lighting conditions, both indoor and outdoor, and the results were among the best we have seen, with vibrant colours – even under fluorescent light or dull exterior lighting – and realistic skin tones.

The C-2500L is a 2.5 megapixel camera with a 3x optical zoom and a 2/3in progressive CCD. Its macro mode

allows you to take images from as close as 2cm and its versatile settings allow for five image qualities from a single, non-compressed 1,712 x 1,368 image filling the supplied 8MB SmartMedia card down to around 50 VGA-sized pictures. The uncompressed super high-quality image is stored in TIFF format, while those of lower quality are compressed JPEG format.

White balance setting can be left in the hands of the camera or adjusted

manually through six colour temperatures, while the Olympus lens is equivalent to a 36-110mm lens in a conventional film camera. To achieve specific focal lengths, the aperture can be set manually and it can mimic conventional film settings with equivalents for 100, 200 and 400 ISO.



own images – it has a 12-second delay and even a remote control, eliminating the need to click and run and allowing you to adjust the zoom. The camera's software suite is simple to use, allowing you to drag images off the camera and drop them straight into directories on

the PC or network, but with only a serial connection it was painfully slow to get our larger images out. This serial cable is supplemented by a converter for use with a Mac, although we would have liked to have seen USB as it would not only have been faster, but also enjoy cross-platform connectivity with just one lead.

The C-2500L has a 1.8in TFT for displaying your images, and once you have activated the shutter the image you have taken is displayed for a few seconds while it is written to media. It is also used for deleting images on-the-fly and

adjusting the camera's settings. The camera runs on four AA batteries. Rechargeable batteries and a charger are included as part of the package.

Overall, we were impressed by the C-2500L and the inclusion of slots for both CompactFlash and

SmartMedia memory is a move we would welcome in more

cameras.

The benefits of SLR in a digital camera were also evident when we examined our photos, which were not only sharp and vibrant but also centred on exactly what we hoped the camera would see. It is difficult to choose between this and the Sony 505 reviewed in the December 1999 issue, for while the Sony had an excellent lens array and produced images every bit as good as the Olympus, its Memory Stick format is not yet as widely used as the SmartMedia and CompactFlash options seen here. At the end of the day, though, at over £300 cheaper, the Sony just pips it to the post, but Olympus still earns itself five stars.

NIK RAWLINSON

The C-2500L's macro mode allows you to take images from as close as 2cm

PCW DETAILS



★★★★★

Price £1,199.99 (£1,021.27 ex VAT)

Contact Olympus 0800 072 0070

www.olympus.co.uk

Good points Dual memory format option, excellent images, many professional features

Bad points Only a serial connection for download, a little pricey

Conclusion A good choice for the serious digital photographer

Creative WebCam Go

Is it a webcam? Is it a digital camera? No, it's the WebCam Go, the motion-sensitive supercam.

Webcams are so passé. There is nothing about them to get you excited any more, so we were pleased to see Creative add a new twist. This is not only a regular webcam capable of 30fps at 352 x 288 or 15fps at 640 x 480, but when you disconnect the USB cable it becomes a standalone digital camera capable of storing 200 320 x 240 resolution JPEG images or 90 at 640 x 480 on its



non-upgradable 4MB memory. The LCD is a basic display showing just the capture mode and the number of images remaining, so you need to use the optical viewfinder to line up.

The lens has three settings for 10ft to infinity, three to five feet and six to eight inches while the four recording modes allow for single, multi-exposure, time-delayed single and time-delayed multiple exposure. Downloading images taken using the multi-exposure setting generates a small AVI file, allowing you to specify the delay between frame changes.

It runs on two supplied AAA batteries when not connected to the bundled USB cable and includes MediaRing Talk 99, WebCam Go Control for controlling the camera and organising your images, and WebCam Monitor – a movement-sensing application that will upload an image to a specified website whenever it detects

motion. A microphone is bundled for video-conferencing, and a copy of Polaroid PhotoMAX software for touching up photos and adding effects.

The WebCam Go is fairly unattractive as a standalone digital camera, and the quality of its images does nothing to rival that of dedicated cameras, but its ease of use, rich features and no-nonsense modus operandi make it a winning product.

NIK RAWLINSON

PCW DETAILS



★★★★★

Price £119 (£101.28 ex VAT)

Contact Creative 01189 344 744

www.europe.creative.com

Good points Easy to use, innovative idea, great price

Bad points Not the best image quality

Conclusion If you want a webcam and a cheap and cheerful digital camera the WebCam Go could be all you need

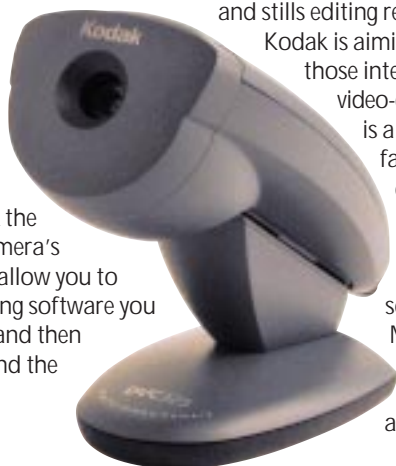
Kodak DVC325

Kodak's problematic webcam is as useful as a conference where you can't hear anyone speaking.

When it comes to photography there are few names as easily recognisable as Kodak. This latest USB camera from the company attempts to improve on its previous offering, the DVC323, by doubling the size of the video image available for capture to a respectable 640 x 480.

The unit comes with a TWAIN driver for importing images directly into editing packages such as Paint Shop Pro. This driver can be used in conjunction with the snapshot button on the top of the camera. Click the button once and the camera's software will pop up to allow you to select which image-editing software you want to use. Select this and then click the button again and the image will be imported.

The camera looks



attractive, having a slim-line design, unlike most other bulbous webcams available. The base is detachable and allows the camera to be tilted through 75 degrees. Laptop users will be pleased to find an additional thumbnail-sized base bundled with the unit for docking the camera on top of their LCD screens.

Presto! VideoWorks and Presto! Mr Photo software are bundled for video and stills editing respectively. However,

Kodak is aiming this camera at those interested in Internet video-conferencing, which

is a tad strange given the fact that the device doesn't have a built-in microphone. It does work with the bundled Netmeeting software from Microsoft, but its performance could hardly be described as flawless.

This was mainly due to the unit's poor drivers. It took us ages to get them working properly and when they did get going it was hard to convince them to capture smooth video sequences. Added to this, both PCs used to test the camera experienced a severe slow-down when the camera was plugged in. This stopped as soon as the device was unplugged.

At present the DVC325 is a respectable USB camera ruined by a lack of usable drivers. One to avoid.

NIALL MAGENNIS

PCW DETAILS

★

Contact Kodak 0870 243 0270

www.kodak.com

Price £99 (£84.25 ex VAT)

Good points Snapshot button, 3m lead

Bad points Awful drivers make this camera largely unusable

Conclusion We cannot recommend the DVC325 with its current drivers

Graphics card shoot-out

This 3D environment ain't big enough for the four of them – only the fastest drawer can win.

In the past few months nVidia's latest graphics chipset has received a great deal of coverage. Much of the interest has been due to its implementation of hardware transform and lighting (T&L) engines that represent a huge step forward in mainstream 3D acceleration. However, most of the coverage has been purely speculative as there wasn't a benchmark available that used these new features. This situation has now changed with the release of 3DMark 2000, which includes tests for T&L and hardware-environment bump mapping. The latter has been supported by Matrox's G400 chipset for some time. Now that a relevant testing suite is available we

decided to do a comprehensive round-up of the latest crop of graphics cards. Lined up at the starting blocks are the Creative Annihilator and Guillemot 3D Prophet, which both use nVidia's standard GeForce 256 chipset. Also from Creative is the Annihilator Pro, sporting the GeForce 256 DDR chipset incorporating a wider memory bus.

the texture engines on the graphics card.

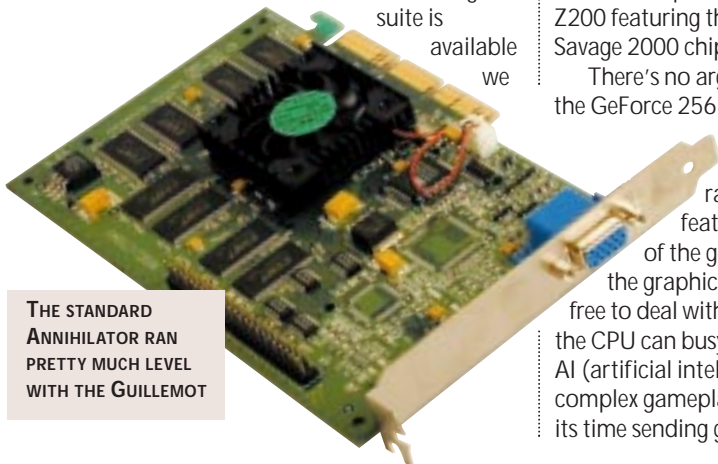
THE DIAMOND VIPER II Z200 SHONE ONLY IN THE ARENA

Finally, we've got the Diamond Viper II Z200 featuring the S3 Savage 2000 chipset.

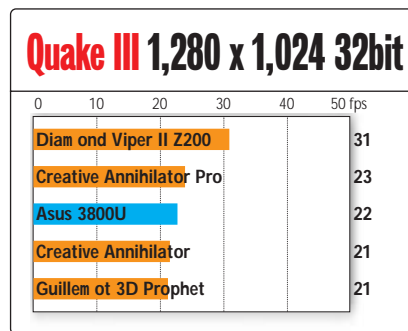
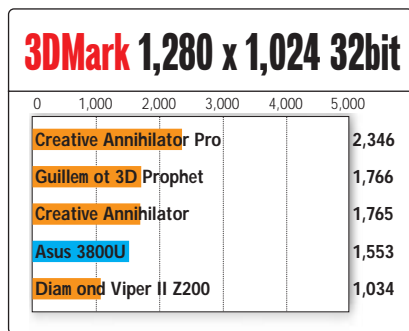
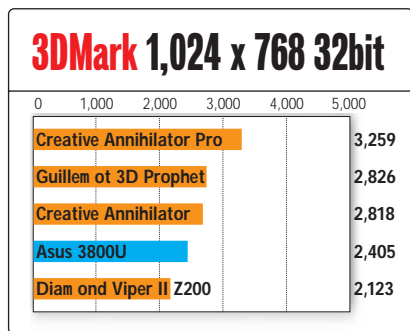
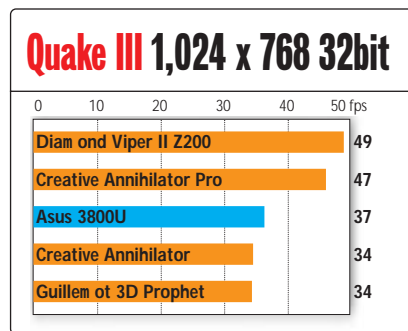
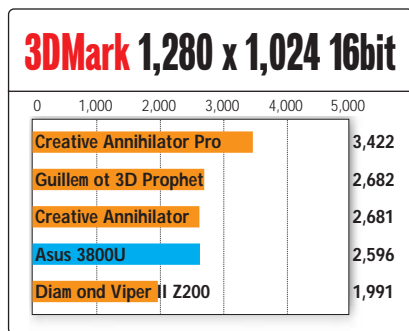
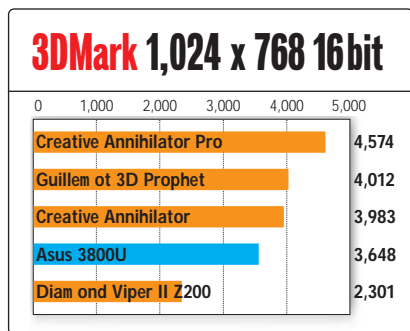
There's no argument that the GeForce 256 is a gamers' chipset aimed at offering the best frame rates and the fullest feature set. By putting most of the geometry calculation on the graphics chip the main CPU is free to deal with other tasks. This means the CPU can busy itself processing better AI (artificial intelligence) or just far more complex gameplay, rather than wasting its time sending geometry calculations to

The games have to be specifically coded to make use of T&L features, but most 3D game developers should be working on this already. id Software already supports T&L with Quake III Arena.

There's very little between the Creative Annihilator and the Guillemot 3D Prophet. They're both based on the same chipset and sport 32MB of memory. The 3D Prophet does have the added feature of a TV-Out port although the usefulness of this is limited. The whole



THE STANDARD ANNIHILATOR RAN PRETTY MUCH LEVEL WITH THE GUILLEMOT



idea of cards such as these is that you can run games in very high resolutions that a TV would never be able to cope with. However, since both cards also ship with software DVD players, the TV-Out could be useful for pumping movies out to a large-screen TV. That said the Creative cards ship with a copy of Evolve Scout, although the target market for these cards is bound to have a large collection of games already. Both cards have a heatsink and fan combination to keep the processor cool and ensure system stability, while the 350MHz RAMDAC will put most desktop resolutions within your reach.

The Creative Annihilator Pro looks identical to the standard Annihilator and in essence they are the same card. The only difference between the two is the inclusion of double data rate (DDR) memory as opposed to the single data rate (SDR) memory used by the other GeForce cards. This extra

CREATIVE'S ANNIHILATOR PRO IS THE ULTIMATE 3D CARD

bandwidth ensures there's no bottleneck and increases the overall performance of the card.

Although most game players will be happy with the standard GeForce 256, the hardcore gamers will want to squeeze that last drop of performance out of their system and will find the DDR version an attractive prospect. The difference is significant, with a quoted memory bandwidth of 4.8GB/sec compared to 2.6GB/sec with the standard chipset.

The Diamond Viper II Z200 is the only card not to use an nVidia chipset, instead sporting a processor from S3, Diamond's parent company. It's been a while since we've seen a great graphics chipset from S3 so we were looking forward to the first Savage 2000 board. Like the Guillemot card the Viper also sports a TV-Out feature in both composite and S-Video flavours. On paper it looked like a great graphics

solution with hardware T&L and environment bump mapping included in the silicon.

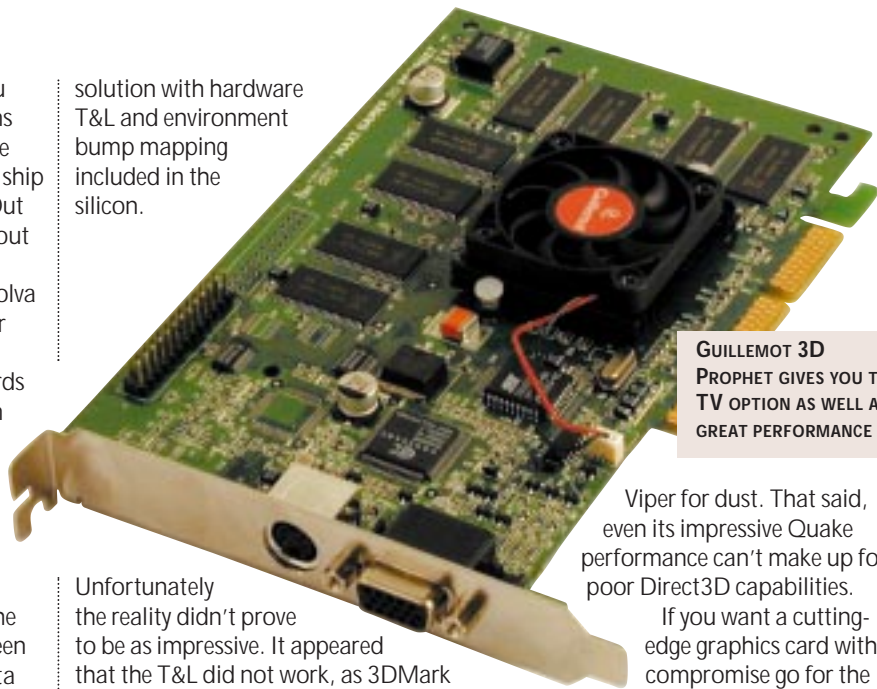
Unfortunately the reality didn't prove to be as impressive. It appeared that the T&L did not work, as 3DMark 2000 reported it was not supported by the card. A similarly disappointing message appeared while trying to run the hardware environment bump mapping test. With the best features of the card absent, the Viper II Z200 produced poor 3DMark scores.

To test the cards we ran 3DMark 2000 at various resolutions and colour depths. We also ran a frame rate test on Quake III Arena. The test

machine was made up of a 733MHz Pentium III in an 820 chipset motherboard with 128MB of RAMBUS memory.

As for performance, the Creative Annihilator and Guillemot Prophet produced almost identical scores in 3DMark 2000, while the DDR-equipped Creative Annihilator Pro produced significantly superior scores in all tests. The Diamond Viper II Z200 proved to be very disappointing, producing the lowest scores in all the 3DMark tests. It was even slower than the Asus TNT2 Ultra card we used as a reference board.

The Quake III frame rate test proved surprising, with the Diamond card outperforming all the GeForce-enabled boards. It's not unusual for a graphics card to excel at OpenGL, the Videologic Neon 250 (reviewed December 1999) exhibited similar behaviour. However, considering Quake III supports T&L, we expected the GeForce cards to leave the



GUILLEMOT 3D PROPHET GIVES YOU THE TV OPTION AS WELL AS GREAT PERFORMANCE

Viper for dust. That said, even its impressive Quake performance can't make up for its poor Direct3D capabilities.

If you want a cutting-edge graphics card without compromise go for the Creative Annihilator Pro. Its full GeForce feature set coupled with its extended memory bandwidth makes it the ultimate card for hardcore PC gamers, but it's not cheap with a street price of £169 ex VAT. Still, it's only £10 dearer than the Guillemot 3D Prophet which doesn't have DDR. If you are on a budget, the standard Creative Annihilator offers good value with a street price of £139 ex VAT and performance every bit as good as the Guillemot card.

As for the Diamond Viper II Z200, we can only hope the problem with the T&L was just an issue with this early board and will be rectified for the retail product.

RIYAD EMERAN

PCW DETAILS

★★★★★

Creative Annihilator
Street price £163.32
(£139 ex VAT)



★★★★★

Creative Annihilator Pro
Street price £198.57
(£169 ex VAT)



Contact Creative Labs 01189 344 744
www.europe.creative.com

★★★★★

Guillemot 3D Prophet
Street price £185.65 (£159 ex VAT)
Contact Guillemot 0208 686 5600
www.guillemot.com

★★★★

Diamond Viper II Z200
Street price £159 (£135 ex VAT)
Contact Diamond 01189 444477
www.diamondmm.co.uk

Pinnacle Studio DV

A serious DV-editing package that provides a **fast, versatile and powerful studio** environment.

Since modern DV camcorders store their video digitally, you can actually squirt the pictures directly into the PC, edit them, then pop them back to tape again with no loss of quality. That's the promise of Pinnacle's Studio DV, so long as your camcorder or video source is fitted with a DV port. To slightly confuse matters, Sony calls this port i-Link, and the standards folk at IEEE call it 1394, but we'll refer to it as FireWire as it was christened by Apple, its inventor.

FireWire is a bi-directional interface, which means just the one connector is used for information coming in and going out. However, UK Customs says anything with video-recording capabilities suffers a higher tax rate, so many British DV camcorders have their DV port disabled for digital input – you'll see it labelled as DV out only. We've heard of some third parties that can modify it, but if you're in the market for a new DV camcorder and intend to digitally edit on your PC, then look for a model with DV in and out.

Pinnacle's Studio DV package consists of editing software, a FireWire cable and a rather fetching red PCI card fitted with one internal and two external FireWire ports. You'll need to be running Windows 98 Second Edition, which supplies the required Texas Instruments 1394 drivers.

Of course you could simply buy an Adaptec 1394 card and now be at the same point, but for around only £20 more, Pinnacle throws in a really neat piece of digital video-editing software. Consisting of three sections, capture, edit and make movie, the clear interface guides you through the process. The capture section tests your hardware's capabilities and allows you to remotely control your camcorder's transport through the FireWire interface.

The DV standard employed by consumer camcorders employs a compression ratio of 5:1, which results in a data transfer rate of 3.6Mbits/sec. Your

hard disk will have to sustain at least 4MB/sec and you're looking at about 13GB of space for an hour of video. Pinnacle's package lets you capture full-quality clips straight away, or low-quality preview files. The latter allows you to quickly handle a large amount of video at the editing stage (an hour in 150MB), and leaves the package to cunningly go back and capture only the bits it needs in full quality for the final render.

Captured video clips are arranged in albums showing thumbnails of how each scene begins. Albums are also supplied with loads of transition effects like fades and wipes, along with sound effects and graphics for titling. To assemble your movie, you simply drag these items one at a time onto the movie window, which can be set to display an official-looking timeline or a simple storyboard-style interface. It's dead easy to just rearrange the clips and fades or swap them for others. Best of all is a preview window that immediately lets you watch your movie complete with effects, without any tedious rendering.

The final section, making movies, allows you to output your masterpiece back onto tape, as an AVI or MPEG1 file, or even as streaming RealVideo for use online. The first option simply renders the movie at full quality, ready to squirt back into your DV camcorder – so long as it's got a DV input. For analog tape, Pinnacle suggests you employ the camcorder's own composite/S-Video and audio outputs to connect it to a VHS.

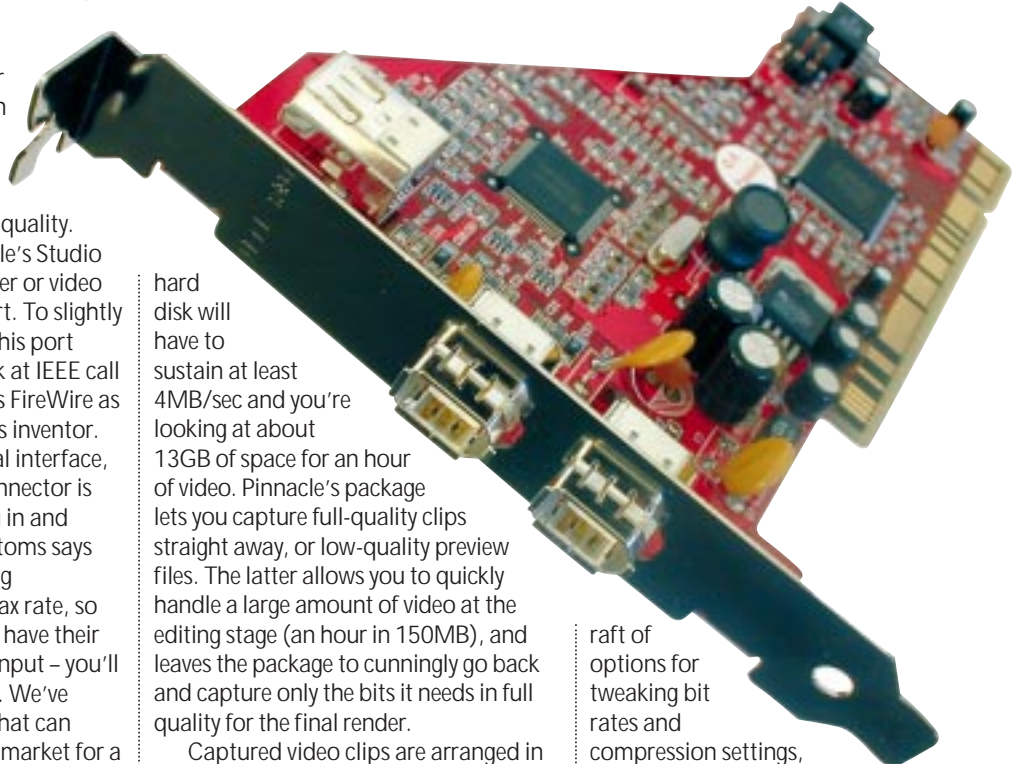
The AVI and MPEG1 sections boast a

raft of options for tweaking bit rates and compression settings, but we were particularly impressed by the RealVideo facility that lets you select your target audience from 28K modem to corporate LAN. The streaming option allows you to choose any number of these and lets the G2 RealPlayer request the one that's most suitable. You will, however, need an ISP that supports RealServer.

All in all, Studio DV is a wonderful package for anyone with a DV camcorder fitted with an in/out port. It's an absolute doddle to use and the RealVideo facility is a very welcome extra, especially when you consider the software's only costing you about £20 on top of the FireWire card.

GORDON LAING

It's dead easy to rearrange the clips and fades or swap them for others



PCW DETAILS



★★★★★

Price £199 (£169.36 ex VAT)

Contact Pinnacle Systems

01895 442003

www.pinnaclesys.com

Good points Very simple to use, and great RealVideo facility

Bad points You'll need DV in/out on your camcorder to go back to digital tape

Conclusion Who needs analog capture? DV camcorder owners look no further

CD-RW Blaster CD Studio

Fiddle while your CD-RW burns, it really is that easy.

Creative seems to be coming up with one great product after another at the moment. Hot on the heels of the fabulously specified SoundBlaster Live! Platinum comes the CD-RW Blaster CD Studio. CD-RW drives have become very popular of late due to the drop in price of the technology, but Creative has put together a package that should be flying off the shelves. Inside the full retail packaging you'll find a 4 x 4 x 24 EIDE CD-RW drive. You'll also find an EIDE cable, a power splitter and screws to mount the drive in your PC. But Creative hasn't stopped there, you also get 10 blank CD-R discs and one CD-RW disc, giving you enough media to get the most out of the package straight away.

There are also two manuals included, covering how to install the drive and explaining how to use the software.

Unlike most CD-RW manufacturers Creative hasn't gone down the Adaptec

route for the bundled software. Instead you get Nero Burning ROM, which may not be as well known as Adaptec's Easy CD Creator, but it works well enough. Using a simple drag and drop method you just grab the files that you want to write to the CD and place them in the corresponding window.

It took about 16 minutes to burn 580MB onto a blank CD-R at four-speed. Of course, if you want to run an integrity simulation before actually writing the data you can more or less double this time.

You also get software from Prassi that allows you to use a CD-RW disc just like a hard disk, in the same manner as Adaptec DirectCD.

All in all the CD-RW Blaster is a stunning package with everything you need to get you on the road to CD



mastering. Add to this the amazing street price of only £149 ex VAT, and you really have something special.

RIYAD EMERAN

PCW DETAILS



Price £175 (£149 ex VAT)

Contact Creative Labs 01189 344 744
www.europe.creative.com

Good points Great package, great price

Bad points None

Conclusion The best CD-RW bundle you can buy

Compaq MP1600

This stylish, diminutive projector will illuminate any presentation, whatever the conditions.

If you are a frequent traveller and use a projector to aid presentations, you'll know how important it is that your projector is not the heaviest object on earth. This latest model from Compaq is remarkably small and weighs only 1.9kg. There's also enough style in its design to impress, and it offers great performance at the same time.

Its native resolution of 1,024 x 768 is more than enough for the vast majority of presentations. Adjustments to the display can be made via easy-to-use controls that guide you through a comprehensive menu. You can change all the usual settings here, including the key



parallelogram setting that allows you to maintain straight edges in all circumstances. You can even zoom in on your image, up to a maximum of 32x.

A standby button helps preserve the life of the unit. One minor niggle we had, however, was that this was located

immediately next to the navigation controls. If you accidentally hit it, as we did a few times, the projector can't be turned back on for 45 seconds, which could prove embarrassing in the middle of a presentation.

A sprung foot combined with a well-placed adjustment button let you vary the height of the unit, while a slider on the top of the unit lets you focus the lens quickly and easily.

Unfortunately this model comes with only D-SUB and Digital connectors as standard, but a video adaptor to give you more ports is available. The display is extremely bright at 600 lumens, and its output can be viewed easily in a well-lit room when correctly adjusted. Overall this is an impressive projector – if you can afford it, it will serve you well.

JASON JENKINS

PCW DETAILS



Price £3,869.28 (£3,293 ex VAT)

Contact Compaq Recommended Resellers
0845 270 4000
www.compaq.co.uk

Good points Small, easy to use, excellent performance

Bad points Control layout could be slightly better

Conclusion An excellent, highly portable projector that adds a touch of class to any presentation

Ericsson Chatboard

A keyboard for your phone that **takes the fingerwork out** of SMS text messaging.

Typing SMS text messages on a mobile phone is a skill that takes both time and patience to acquire – so much so that most people don't bother. The word 'hello' takes 13 keystrokes, the only vowel that takes one keypress is 'A', and 'S', the second most used letter in the English language, takes four presses. What's needed is a quick way to type messages on a phone.

This is so obvious it's surprising that no-one has produced a device like the Ericsson Chatboard before: a small 10 x 5cm keyboard that plugs onto the bottom of most



Ericsson phones. It maps onto the phone's keyboard matrix so when you press the Z key it flashes a W, X and Y onto the screen before the Z appears. This makes numbers – that come after letters – very slow and you either turn the keyboard beeps off or annoy everyone around you.

But where the Chatboard really scores is in the services Ericsson has provided, built around the www.chatb.com website. When you get a Chatboard and register at the site you are given a personal area. This works with an SMS-to-email gateway so that you can send emails by typing SMS text messages.

You can even add attachments to the emails by uploading them to your area on the website and then pressing the attachment button while typing an SMS. You give a reference for the file on the site and the person who receives the email gets the attachment. Replies to the email are read from the site.

It's something that makes a mobile phone a more powerful tool, but what is really impressive is the price. At £20 it's an amazing bargain.

SIMON ROCKMAN

PCW DETAILS

★★★★★

Price £20 (£17.02 ex VAT)
Contact Ericsson 0990 238238
www.chatb.com

System requirements Any Ericsson phones newer than the 768, including the 768e, SH888, S868, A1018, T10 and T18, but not the T28

Good points Turns a mobile phone into a great way to send emails. Well thought out integration with the website makes it amazingly useful

Bad points No underscore, messages are limited to 160 characters, the mobile networks charge too much for SMS

Conclusion If you have an Ericsson phone then the Chatboard is a must-have

Eicon DIVA USB

A USB device to **put you on the highway** to ISDN.

Eicon's DIVA USB has to be one of the oddest-looking pieces of hardware we've come across. About the same size and shape as a mouse (but available in a cornucopia of colours) it represents ISDN specialist Eicon Technology's first venture into the realm of USB.

The DIVA USB is an ISDN adaptor. It is designed to attach to an ISDN 2e or Home/BusinessHighway connection,

and offers up to 128Kbits/sec of bandwidth to the Internet or remote office user. The device is not only small and light (about 70g) but its USB port makes it very flexible in that it can be quickly and easily swapped between desktop and notebook PCs, making it a good choice for the mobile user. Sadly, there's no Mac support at present.

The DIVA USB sports a 32bit WDM CAPI 2.0 driver, with an NDIS WAN mini-port interface. It also supports G3 faxing (and G4 aka 'ISDN faxing') and a good smattering of voicemail and file transfer facilities, courtesy of the bundled German-sourced RVS-COM Lite software. So, armed with a DIVA USB and RVS-COM, a branch office could make do with just an ISDN 2e line.



Installing the DIVA USB was simple, as expected, although the install wizard does need some techie ISDN info from you. The manual covers just the installation and troubleshooting, with the rest of the information located on the CD-ROM. As soon as you insert the USB plug, the software installation commences, and although this is simple enough it could be made simpler still.

Complete installation of the RVS-COM Lite comms suite requires further intervention. Once installed you can insert and remove the DIVA USB on-the-fly – a trio of status LEDs on the device indicate all is well.

ROGER GANN

PCW DETAILS

★★★★★

Price £99 (£84.25 ex VAT)
Contact Eicon Technology
 020 8967 8000
www.eicon.com

Good points Cheap, versatile, well designed, good software bundle

Bad points USB cable could be longer

Conclusion An early bath is in prospect for PC Card ISDN adaptors, the quirky DIVA USB is not only cheaper, but more versatile and easier to use

HP Jornada 430se

A PDA **hobbled by its OS** for those with a very limited MP3 collection.

Palm's Revo and the latest batch of Palm organisers from 3Com have set the standard as far as handheld screens go, and the colour competition just can't quite live up to these monochrome wonders. Unfortunately that's true of this Jornada and it suffers from a certain amount of 'shimmer'. It's a shame, too, that Windows CE is such a demanding OS. The 430se has a 133MHz processor but CE slows this to a crawl.

HP is aiming this product at the mobile professional in need of a business and entertainment tool, and with this in mind it has integrated Utopiasoft Hum MP3 player and a headphone jack. To put this to good use, though, you'll have to invest in a CompactFlash card to increase the memory: the Jornada has 16MB of RAM, that has to be shared with your data. Even if you could devote it entirely to MP3s and no data you would be able to store no more

than four or five average length tracks.

On a more positive note, Hewlett-Packard's usual excellent screen adjustment settings have been integrated, giving immediate access to presets for indoor and outside use, and EzExplorer lets you navigate the internal memory in the same way that you would explore your PC's hard drive. If you really can't get on with handwriting recognition, you also have the option of upgrading to HP's external keyboard.

Hard icons on the front give quick access to contacts, calendar, tasks and calculator, and can be reconfigured to suit your specific needs. Further buttons along the left edge control the way applications work, but are only labelled on the Jornada's fold-back front cover, so when it's flipped back in use they are unlabelled.

Ultimately, the Jornada 430se is the logical progression of an evolving product line, but it suffers from a rather



chunky operating system and a disappointing display.
NIK RAWLINSON

PCW DETAILS



Price £389.99 (£339.57 ex VAT)

Contact Hewlett-Packard 0990 47 47 47
www.hp.com/uk/

Good points Memory navigation and screen setting utilities

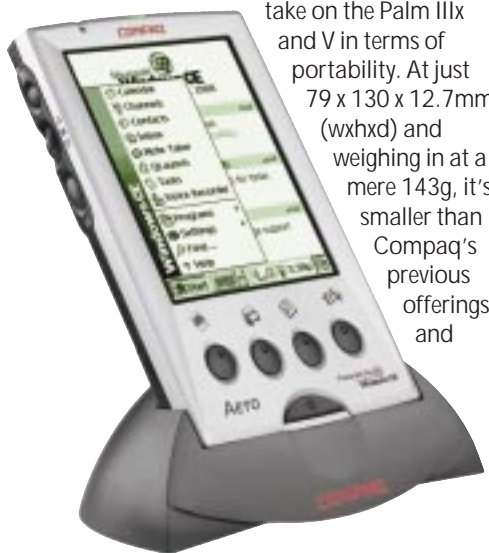
Bad points Disappointing screen, small initial memory allocation considering the inclusion of an MP3 player

Conclusion It's a nice idea, but the technology is not quite ready to pull it off

Compaq Aero 1520

A WinCE device small and light enough to **pose a serious threat** to its palm-sized rivals.

Compaq's latest palm-size PC is a definite break from the norm, at least when it comes to Windows CE devices – it's small. In terms of size and weight, it's about the first WinCE device that can honestly take on the Palm IIIx and V in terms of portability. At just 79 x 130 x 12.7mm (wxhxd) and weighing in at a mere 143g, it's smaller than Compaq's previous offerings, and



weighs only 30g more than the Palm V.

The diminished stature has a lot to do with the 16-greyscale STN LCD display, which is a bit lifeless, but perfectly adequate for a handheld PC. For those darker moments, as you might expect, there is an easily accessible backlight. Such a display needs a protective cover of sorts, and it's good to see that, rather than plump for the ungainly plastic covers of the HP Jornada 430se and Palm IIIx, the Aero 1520 comes supplied with a leatherette case.

The 16MB of RAM is par for the course, but this can be increased through the addition of Flash memory – in this case, there is a CompactFlash slot. The design itself is functional, with four customisable shortcut buttons, the backlight button beneath the display, and three side-panel buttons, one for voice recording, one used as an 'Exit' button and the other a mini-rocker button for scrolling and selecting.

The rechargeable lithium ion battery

has an estimated life of eight hours and, with the power supply connecting to the docking cradle, recharging is a simple matter of attaching the 1520 to the cradle. The 1520 also synchronises with your PC seamlessly. This is largely due to the fact that almost all PCs run Windows, but Microsoft's latest sync software, ActiveSync 3.0, also seems to have made the process easier.

JIM HARYOTT

PCW DETAILS



Price £279.65 (£238 ex VAT)

Contact Compaq 0845 270 4848
www.compaq.co.uk

Good points Size and weight, synchronisation with Windows-based PCs

Bad points Screen, WinCE still slow

Conclusion Compaq has learnt that many people's priorities lie in size and portability, rather than excessive functionality. The Aero 1520 is one of the best value and most usable WinCE-based handhelds yet

Windows 2000

It's been a long time coming, but it's **worth the wait**, as Windows 2000 adds a lot of functionality.

Microsoft has been working on Windows 2000 for years. With millions of lines of code, and four different versions, Windows 2000 is one of the biggest engineering projects ever. As we get closer to its release, the moment of truth is nearly upon us. Will Windows 2000 be as successful as Microsoft expects?

The four versions of Windows 2000 are Professional, roughly equivalent to NT4 Workstation; Server, roughly equivalent to NT4 Server; Advanced Server, roughly equivalent to NT4 Server Enterprise; and a completely new version, Datacenter. Professional is a desktop operating system that is also suitable for use on laptops, while Server is intended to provide file, print and Internet services to SMEs. The Advanced Server is for enterprise applications, while Datacenter is intended for very large applications that need immense processing power and large data stores.

You're most likely to come across the Professional and Server versions, as these are direct replacements for the most commonly used versions of Windows NT4. Windows 2000 Professional is the replacement for the perennial Windows NT Workstation. With a similar user interface to Windows 98, Professional actually conceals a complete 32bit operating system, with no trace of DOS.

Windows 2000 is designed to upgrade existing Microsoft desktop

operating systems, and can be used to upgrade Windows 95 and 98, and Windows NT Workstation. Our test machine was a PIII 500, and we installed it as a dual-boot operating system. There were no problems in detecting the video and sound cards installed in our test machine, apart from an MPEG2 decoder card, which has yet to have Windows 2000 drivers developed. If you're worried about the hardware you've installed in your PC, Microsoft has a list of tested compatible hardware on its website. You'll also find lists of drivers under development on the Internet at sites like www.betanews.com.

Windows 2000 depends on the browser being an integral part of the OS



We were able to install a wide range of software on our test system, and while very few packages have been certified for use on Windows 2000 at this point, most 32bit software will run on Windows 2000 Professional without problems. As Windows 2000 protects and rebuilds core DLLs and other system components, you should be safe from packages overwriting the operating system and causing problems.

Windows 2000 Professional

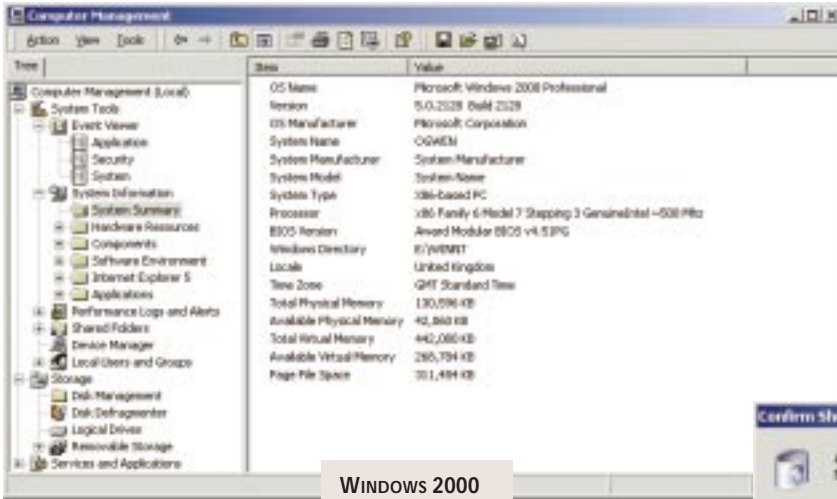
Windows 2000 Professional comes with the basic applications to get you started, including a version of Microsoft's Internet Explorer browser. Like Windows 98, Windows 2000 depends on the browser being an integral part of the operating system, as it is used to handle the system's administration tools as well as web browsing. Windows Explorer uses a web view of the file system, and will display thumbnail views of files as well as directory listings. If you're going through a directory of images, you'll find a small image viewer embedded in Explorer that allows you to zoom into images without

having to launch an image-editing program.

By default Windows 2000 Professional doesn't install every available component. If you want to use it as a web server, you'll need to install the web server using the 'Add/Remove Components' control panel. The Professional version of Internet Information Server isn't intended to be used as an Internet-facing web server, more as a development tool or workgroup intranet server. If you want full-scale Internet services you'll need to use Windows 2000 Server or better.

Microsoft is trying to make Windows 2000 Professional a document-centric operating system. Where NT4 and Windows 98 have the 'My Computer' icon at the top of the screen, in Windows 2000 this takes you straight to the default document store. This needn't even be on your PC - it's quite easy for server administrators to set up your documents folder on a central server, which makes backups easier, and allows you to move from PC to PC.

The same is true of the Windows Explorer, which has been demoted to the 'Accessories' menu. When opened, this launches straight into My Documents, hopefully keeping users away from the system and application directories. Windows 2000 will also hide key system and application files from display in



WINDOWS 2000 PROFESSIONAL'S COMPUTER MANAGEMENT TOOL IS AN MMC CONTAINER, FULL OF SYSTEM MANAGEMENT TOOLS AS WELL AS DIAGNOSTICS

Explorer. While power users will probably want to display them, the average user won't even know they're present. This means that users won't accidentally delete core DLLs.

Support personnel who are familiar with users trying to delete an application by dragging its desktop icon to the trash can, will be relieved that this action now produces a dialog box that takes them straight to the 'Add/Remove Programs' control panel.

Other improvements include using the same technology as the Office 2000 smart menus in the Windows Start menu. Applications that aren't regularly used are hidden, and are only redisplayed by a user action. Microsoft has also put a drop shadow behind the mouse pointer, which is pointless and uses valuable processing power. You can turn it off in the Mouse control panel.

Microsoft has updated the user interfaces of most system components, taking its cue from the world wide web. The first fruits of this appeared in Office 2000, but Windows 2000 Professional takes it several steps further. The familiar tabbed dialog boxes remain for most of the simpler tools, but more complex control panels have new-look dialog boxes, while others have become MMC (Microsoft Management Console) snap-ins.

The Microsoft Management Console handles all the administration tasks you might find on a workstation. These include local users and groups, as well as a disk defragmenter based on the popular DiskKeeper software. You can also use a disk clean-up utility that will

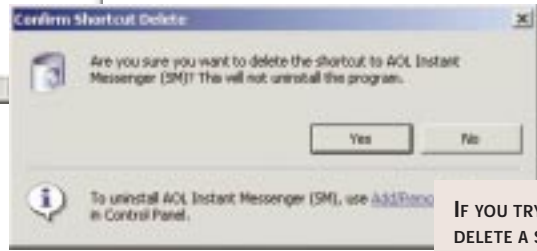
remove unused components and applications from your drives.

One of the more interesting features of Windows 2000 is its ability to use an extended file system.

You can create logical file systems that run on both local and remote machines and can be audited and given more complex security policies than a standard drive. You will need to use Windows 2000 native NTFS5 file system in order to use these. NTFS drives can also be encrypted, so that only approved users can access the information on them. If you're using Windows 2000 Professional on a laptop, this is very useful as confidential documents can be kept secure if the machine is lost or stolen.

One area where Windows 2000 Professional is a distinct improvement

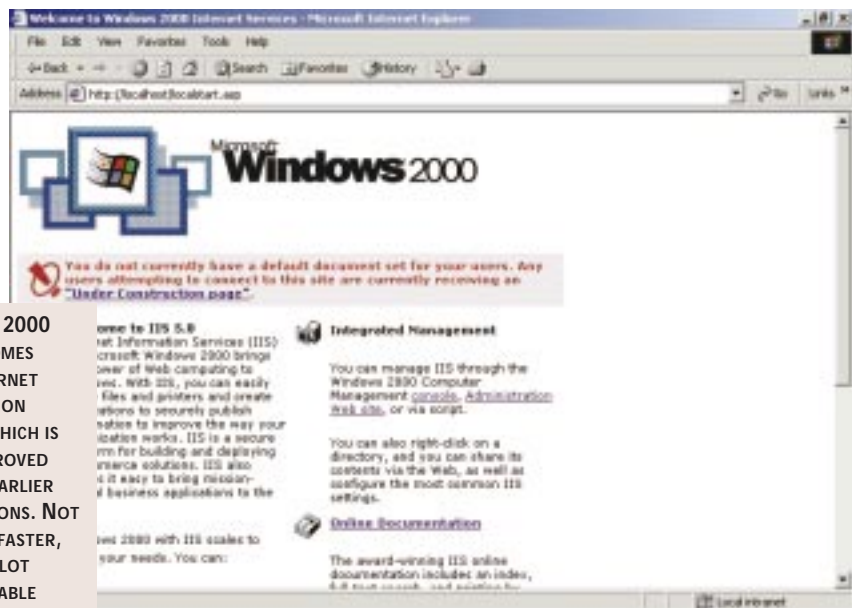
over Windows NT4 Workstation is its support for mobile users – it'll run on anything from a tiny Toshiba Libretto to a high-end PII Compaq or HP laptop. It supports PC Cards, though these may be affected by the power management functions. Microsoft has decided not to provide full Plug and Play support for 16bit PC Cards, opting instead for the newer Card Bus 32bit devices. You'll also be able to use Windows 2000's ACPI support to handle power management, with the OS handling both suspend and



IF YOU TRY TO DELETE A SHORTCUT FROM THE DESKTOP YOU'LL BE REMINDED THAT IT WON'T DELETE THE APPLICATION, AND GIVEN A LINK TO THE WINDOWS 'ADD/REMOVE PROGRAMS' CONTROL PANEL

hibernate functions. If a laptop is hibernated, Windows 2000 will save the state as a file, and shut down the PC completely, recovering when it is restarted. We also tested Server on a laptop, and found that these functions were supported as well, so you can use a laptop as a demonstration server with no problems – as long as it has enough memory.

If you're a mobile user you'll definitely want to upgrade to Windows 2000 Professional. It's far more stable than Windows 98, and it gives you access to a wide range of power and configuration management tools. There's also plenty of



WINDOWS 2000 SERVER COMES WITH INTERNET INFORMATION SERVER, WHICH IS MUCH IMPROVED OVER ITS EARLIER INCARNATIONS. NOT ONLY IS IT FASTER, BUT IT'S A LOT MORE RELIABLE

support for removable PC Cards, and for advanced power management features.

There's not much to worry desktop users either. Most of the applications you regularly use should run under Windows 2000, and the upgrade process is generally smooth. There are some issues over hardware support, as some manufacturers are taking the release as an opportunity to make some older hardware obsolete.

Windows 2000 Server

Windows 2000 Server is the mid-range member of the family, designed to handle the most common tasks given to NT4. Microsoft describes it as a tool for small to medium enterprise deployments.

We installed Windows

2000 Server on a dual-processor Pentium II system, and found that it performed extremely well. Installation was quick and easy, and led straight into the 'Configure Your Server' display panel. This web-based panel is where you begin to set up the key functions of your system. You're first asked if you're setting up a sole server, or part of a network. Choosing a single server setup takes you straight into the most complex part of any Windows 2000 installation – setting up the Active Directory.

You'll need to have a good idea of what you plan for your network before you start. While a registered Internet domain is a good idea, you can create domains that fit into your own naming structure – so you can happily have an active directory for '.smith' or '.office' rather than 'smith.com' or 'office.co.uk'. Setting up a Windows 2000 Server as an Active Directory server is easy enough –

setting up a single server from the 'Configure Your Server' panel handles the initial configuration of your system's directory. You can then use the Active Directory users and the computer's MMC snap-in to set up your users and the computers in your network.

Setting up a new user is deceptively easy. However you'll find many new tabs – including tools for setting up Terminal Services session settings. If you're going to use Windows 2000 and Terminal Services to manage users and their applications, you can define remote user profiles and home directories for your remote users. This will allow you to control users in a large site a lot more

effectively. As this is a directory service as well as an access control

system, you can also set up contact information for your users – and this will also be used by Exchange 2000.

The Active Directory will also manage the machines in your network, allowing you to record details of who manages them, and where they are. It will interrogate them and display details of their OS levels, so you can deal with upgrades and have your finger on essential support information if you need it. Active Directory will require an NTFS5 system in order to operate. It is possible to convert a FAT or FAT32 file system to NTFS5 using a command-line tool, though this can take some time – especially if you've got a large full disk! We'd recommend making the move to NTFS5 very early in your migration to Windows 2000.

Microsoft refers to the

family of technologies headed by Active Directory as IntelliMirror, and these allow you to manage systems and users more effectively. One function of IntelliMirror software is its ability to give your users roaming profiles, so that they can move from one machine to another, and find that not only their files, but also their applications follow them. By using the new Microsoft installer introduced with Office 2000, a user's profile will also contain information about applications and directories they use. You can force a user's home directory – and their 'My Documents' folder to be held on a central server – so they can access it from anywhere on the network.

System administrators will find that Windows 2000 is easier to maintain than NT4. Not only does it use the MMC technology introduced in the NT4 Option Pack for all its administration tools, but most of the tools can also be accessed from the Control Panel's Administrative Tools section. We also found the Computer Management MMC snap-in a one-stop shop for all the tools and features you need to control your server. As it's an MMC component you can add any new snap-ins as they're installed on your machine.

Where Windows 2000 Server has an advantage over its predecessors is in its ability to allow the delegation of responsibilities. An NT4 server really requires a single administrator – but that administrator shouldn't be the master of

all trades. If you're running a web server you'll want the web master to be able to handle some, if not all, administration tasks.

Delegating responsibility may be risky, but by limiting the functions that are available to your assistants, you'll be able to control what they do.

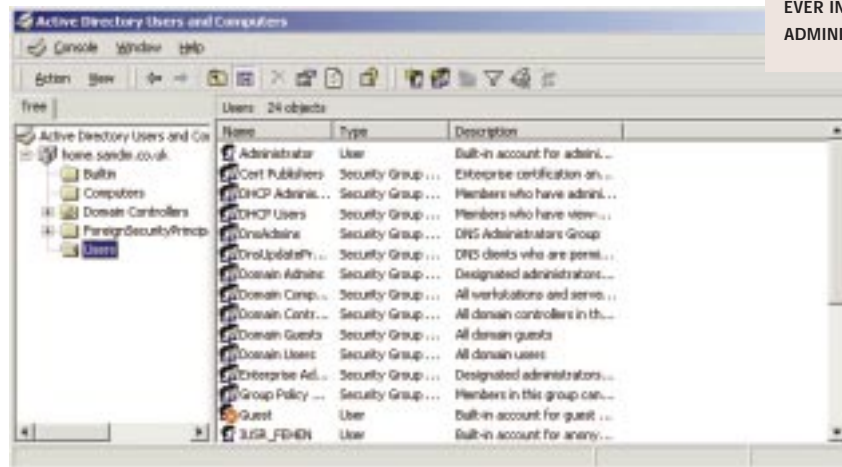
One of the core components of Windows 2000 Server is the latest version of Internet

Information Server. IIS 5.0 is a great improvement over previous releases, and includes features that make it much more suitable for public-facing Internet services. Probably the most important of these is its ability to auto-restart – so you won't need to go round and restart your NT server every time IIS crashes. We also found that it was much faster than IIS 4.0, especially when serving pages created using Microsoft's dynamic ASP technologies.

Windows 2000 Server also makes the

With Active Directory you can create domains that fit your own naming structure

THE ACTIVE DIRECTORY MAY SEEM TO BE JUST ANOTHER WAY OF CONTROLLING YOUR SYSTEM'S USERS AND GROUPS, BUT IT'S PROBABLY THE MOST COMPLEX APPLICATION YOU'LL EVER INSTALL OR ADMINISTER



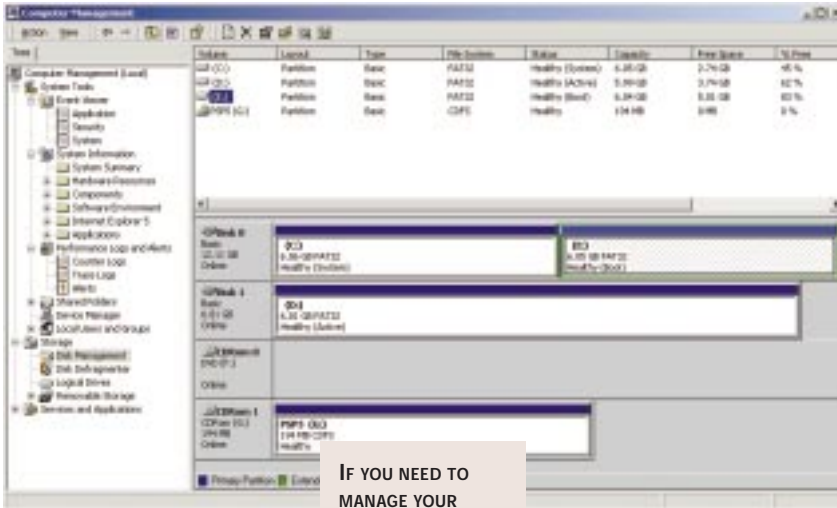
Windows NT4 Terminal Server part of the core Windows services. Terminal Services can be used to display your server's desktop on a remote PC, whether it's Windows 2000 Professional, 98, 95, 3.11, or even CE. Client software is included for all these platforms, and it's also ready for use with third-party network computers and terminals.

The Windows 2000 Server family will also include the, as yet unreleased, Datacenter version which is intended for massive multi-processor installations. With Datacenter you'll be able to work with large arrays of disks and huge amounts of memory. These 32-processor systems with 64GB of RAM are extremely expensive, and the applications for them

out into the enterprise. The adoption of the SOAP XML-RPC model in Visual Studio 7.0 looks likely to accelerate this, by making Windows 2000 applications able to work with Unix and Java applications without the overheads of complex bridges and interfaces.

It is important to remember that implementing a Windows 2000 system isn't a matter of taking the CD out of the box and clicking 'Install'. With features like IntelliMirror and the Active Directory you'll need to familiarise yourself with the new concepts and technologies. We'd recommend spending some time with Microsoft's training materials and planning information before attempting to set up an Active Directory machine. Planning information is available on Microsoft's website, or in the Windows 2000 Evaluation and Deployment Kit CD-ROMs.

SIMON BISSON



IF YOU NEED TO MANAGE YOUR MACHINE'S DISKS, WINDOWS 2000 GIVES YOU A LOT MORE IN THE WAY OF TOOLS. THERE'S EVEN A SET OF CLEAN-UP TOOLS AND A DEFRAGMENTER BASED ON DISKKEEPER

Terminal Services needn't be used to export the entire desktop, though this is a useful administrative function, as you can use it to deliver applications. By exporting an application user interface you don't need to worry about maintaining it on every PC, so you only need to update once. This is ideal if you're rolling out software with a fast replacement cycle.

Advanced Server and Datacenter

All the features of Windows 2000 Server are present in Advanced Server. However, Advanced Server adds support for four-way processors, as well as tools for clustering servers. Two clustering methods are available, either using Windows load balancing to control access to Internet-facing web servers, or a tool for creating clusters that will ensure applications are always available.

Windows load balancing allows you to create farms of web servers with access controlled by how busy each server is. Windows load balancing monitors the performance of the servers, and connects users to the least loaded server – so websites respond quickly and reliably. You can then use COM+ and the server clustering tools to create more reliable application servers, either for web transactions or internal business systems.

are limited to extensive data processing or scientific simulations. Datacenter will also support large numbers of users, so could form the basis of Terminal Services-based Application Service Providers capable of servicing tens of thousands of simultaneous users.

The server is definitely designed to make an administrator's life easier. The MMC may take a little time to learn, but it soon becomes invaluable. However, the most significant features are the Active Directory, and the inclusion of Terminal Services as a default. Instead of being a file, print and web services tool, your Windows 2000 Server becomes a crucial part of your business processes. You may not like being forced into this by Active Directory, but you'll need it to get the most out of Windows 2000 – and especially the IntelliMirror systems management tools.

We were also pleased to see a significant improvement in the performance and reliability of the Internet Information Server web server. Advanced Server adds features to allow you to handle more processors, and to cluster your servers together. With a set of Advanced Servers, and applications written to take advantage of the COM+ application server, Windows applications look likely to start to move

PCW DETAILS



Prices Windows 2000 Professional £260, Win2000 Professional Upgrade from Win95 or Win98 £170, Win2000 Professional Upgrade from WinNT Workstation £100, Win2000 Server with 10 Client Access Licences £950, Win2000 Server with 10 Client Access Licences Upgrade from WinNT Server £450, Win2000 Advanced Server with 25 Client Access Licences £3,185, Win2000 Advanced Server with 25 Client Access Licences Upgrade from WinNT Server Enterprise Edition £1,560. Price for Datacenter to be set at a later date. All prices are estimated retail, excluding VAT, for single-copy purchases.

Contact Microsoft 0345 002 000 www.microsoft.com

System requirements Not finalised by Microsoft at the time of going to print

Good points Stable and able to work with most existing applications. Professional is good for mobile users, and Server for most server operations – with a dramatically improved web server

Bad points Untried and untested, with some hardware not yet supported by drivers. Setting up an Active Directory can be a complex operation

Conclusion Windows 2000 looks as though it will live up to the hype. The extended development cycle has meant that it's relatively bug-free, and can be rolled out fairly soon after release. The really important changes are under the surface, with an integral application server in COM+ and the advanced Active Directory. As a result we'd recommend spending some time learning about the new features before starting an implementation, especially if you're going to use the Active Directory

Corel Linux

An improvement on the original, with a **user-friendly** graphical installation wizard.

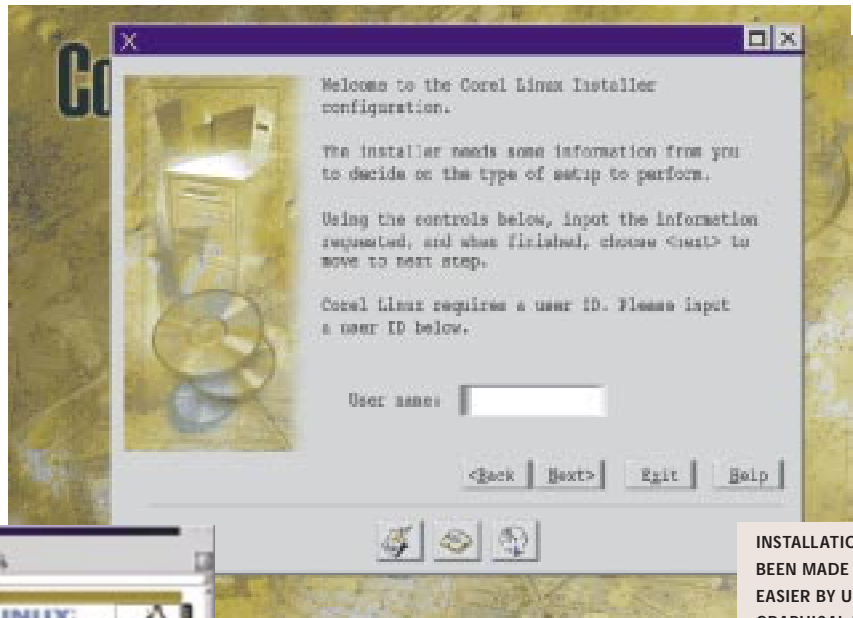
Corel Linux was one of the most anticipated Linux distributions last year, and racked up an impressive 47,227 downloads during its first week of release on CNET's download.com. Corel Linux is currently only available as an ISO CD image, so to make use of the 320MB download you spent three days dragging down from the net, you'll need a CD writer. If you haven't got one or don't feel like lining telephone companies' pockets you can order a CD direct from Corel for \$4.95 plus shipping. The company will convert this to your local currency when it accepts your order.

While Linux is a stable, advanced operating system it is not for the uninitiated. It won't always work first time, can require a bit of tweaking and generally should be left to those who enjoy activities like this.

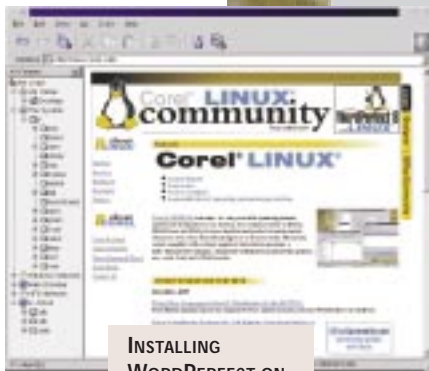
Corel is hoping to change all this. Gone are the text-based install screens written in badly translated geek; with Corel Linux you're treated to a fully graphical installation wizard written in sensible English. However, if Xwindows won't run on your particular hardware setup you won't even get as far as the welcome screen, the machine will just spit out the CD and quietly reboot.

For the time being, this is a reasonable compromise since the current market for Corel Linux is likely to be people who want to run it as a desktop OS and therefore want a GUI. If you just want a console-based server then a text-based install won't phase you. In terms of hardware compatibility, Corel Linux is no better or worse than other distributions – some pieces of kit might make it wince, but this is all well documented on Corel's website.

After plugging through the setup screens we were ready for the final reboot. Everything seemed to have been painless – if anything, we've experienced



INSTALLATION HAS BEEN MADE MUCH EASIER BY USING A GRAPHICAL INTERFACE



INSTALLING WORDPERFECT ON COREL LINUX PRODUCED THE FIRST PROBLEM

more taxing Windows installs.

Reset the machine and the first thing you'll notice is the graphical shell that sits over

LILO (the Linux LOader), the only minor gripe being that it sets the default boot option to Linux without asking if you

would rather have Windows. After a couple of minutes the system powers up the XServer and you are presented with a graphical login. By default the KDE window manager is set up for you and greets you once you step through the door. One major addition on the K menu (equivalent to the Windows Start menu) is Corel File Manager, which provides a very 'My Computer' view of things from your home directory to other machines on the network. While this isn't Linux for idiots it is a step in the right direction.

We encountered the first hiccup when we installed WordPerfect for Linux. The default Corel Linux installation does not include all the libraries required by WordPerfect and therefore it fails to run. A check on Corel's website confirmed the missing library complete with instructions on how to add it. Using the Corel Update utility it was just a matter of selecting the

required package and clicking update. As well as performing updates from CD the utility can also connect to ftp sites, allowing Corel to post simple upgrades in the future.

Having been through a number of Linux distributions over the years, Corel's offering puts the others to shame. Installing an operating system from scratch is never going to be easy, but that doesn't mean that it shouldn't be made as straightforward as possible. If we're not careful Corel could push Linux out of the domain of the hackers and the techies and land it right on the normal user's desktop.

WILL HEAD

PCW DETAILS



★★★★★

Price Free to download.
\$4.95 for CD direct from Corel
Contact Corel 0800 581 028
<http://linux.corel.com>

System requirements Available from Corel's website

Good points Fully graphical, straightforward install. Simple-to-use file manager. Effective update facility

Bad points Minor hardware compatibility issues

Conclusion Corel has taken the stability and flexibility of Linux and added ease of use and good styling

Sage Line 50 v.6.0

A neat piece of software that lets you take **as much or a little** as your company's accounting needs.

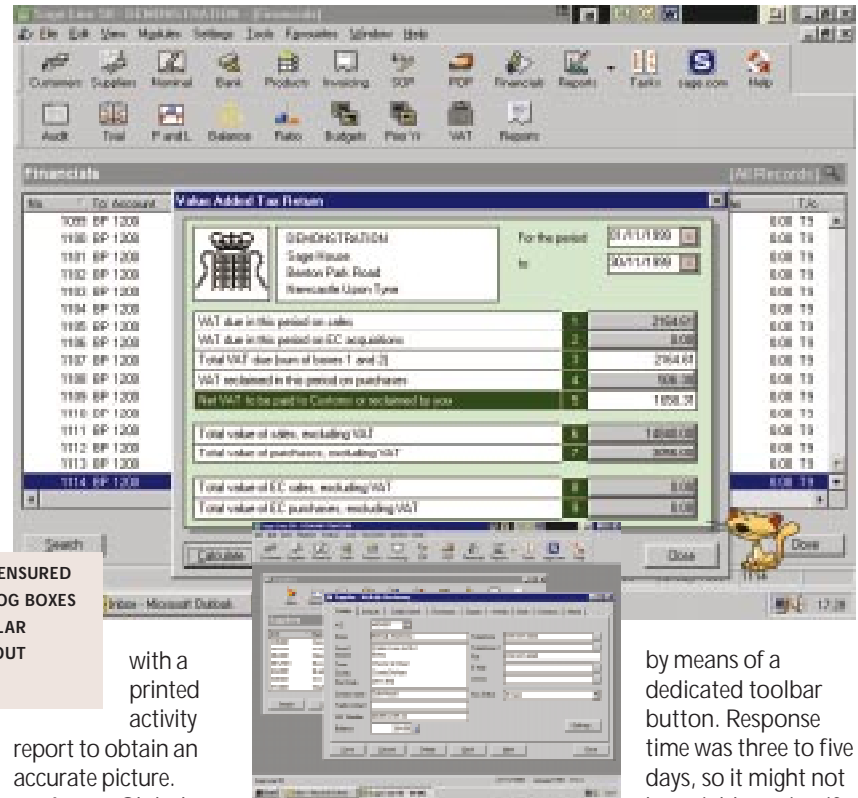
Before you can take full advantage of any accountancy package, you often have a lot to learn. Most users, in fact, never learn how to use everything that the most extensive packages can do and so with this in mind Sage has produced a basic release of Line 50 and backed it up with enhanced packs for the more demanding user.

The most basic package offers a full bookkeeping facility and everything a small business should need with sale, purchase and nominal ledgers, VAT management, bank control, and management accounts, together with handy Report Designer, Global Search and Task Manager features.

If you need invoicing, stock control, cheque printing and the like, though, you'll have to opt for something higher up the stack. Top of pile is Financial Controller, which includes a network option. Multi-company licences for this can be obtained for an additional charge.

Sage Line 50 is peppered with wizards designed to assist complicated transactions. Using them is a simple matter of following on-screen instructions and Sage has ensured that dialog boxes are similar throughout the suite. A wide range of reports is available to assist in presentations and the production of invoices and orders. A 'Report Favourites' facility is accessed from the main toolbar, taking you straight to your most frequently used reports quickly and easily. The facility to cut and paste data into similar reports is another valuable time saver.

Customer and supplier details can be entered manually or with the help of a wizard. The range of fields is impressive, with spaces for discounts, settlement terms and so on. Activity reports for both customers and suppliers are available as graphs or in conventional line-by-line table of entries format. We found these graphs confusing and, although they look impressive, we were unable to verify their accuracy. In some cases the legend showed no resemblance to the markings on the axes and, in most cases, it was difficult to read the actual figures to which the peaks and troughs related. You would need to complement the graphs



SAGE HAS ENSURED THAT DIALOG BOXES LOOK SIMILAR THROUGHOUT THE SUITE

with a printed activity

report to obtain an accurate picture.

A new 'Global Changes' option has replaced the old 'Criteria' facility. It lets you change the values on all, or just a selected group of accounts or products at the same time. In this way, credit limits and percentage price increases can be altered quickly and accurately without having to call up each individual customer or product code.

Manual calculation of fixed asset depreciation, accruals and prepayments is now a thing of the past: the 'Month End' option will make the monthly depreciation postings for you. Similarly, accruals and prepayments can be spread over the months to which they refer, affording a greater accuracy to monthly management accounts.

Help is abundant. When you're learning a package as comprehensive as this, you'll find keyword searches very useful. We had no trouble finding the answers to our questions and the advice and explanations were easy to follow and to understand. Hitting F1 at any time brings up context-sensitive help, saving you from a manual trawl.

Once registered you can take advantage of the online help facility for more specific problems. This is accessed

by means of a dedicated toolbar button. Response time was three to five days, so it might not be a viable option if

you have VAT return deadlines looming. Sage's new Internet service also provides a host of useful services such as online credit referencing of potential customers, parcel tracking and live business and financial news and information.

SHEILA FRANKLIN

PCW DETAILS



Price From £464 (£395 ex VAT)

Contact Sage Software
0845 3000 900
www.sage.com

System requirements Pentium 90 processor or greater, 16MB RAM and 40MB hard disk space after Windows installation

Good points Comprehensive help file with easy-to-understand instructions. Easy tracking of customer and supplier trends. Management accounts and VAT returns easy to produce

Bad points We found the graphs somewhat confusing to interpret

Conclusion A good package that is easy for the beginner to use while providing many enhancements for the more experienced user

Sun StarOffice 5.1

A great performer which, once usability problems have been sorted out, will challenge Microsoft.

StarOffice is famous for two things, first that it is free and second that it is cross-platform, running on Solaris, Linux, Windows and OS/2. Now owned by Sun, StarOffice seems to be an attempt to undermine Microsoft Office, and also as preparation for a new era in Office productivity when you might run applications and open documents from a central location accessed over the web. Sun would benefit from this 'StarPortal' concept by selling servers and services. In the meantime, StarOffice is a free alternative to commercial Office suites on Windows, and as a solution for users of Linux or other supported systems.

the main menu and toolbars, in a style that is similar to Windows MDI (Multiple Document Interface).

StarOffice's main document types are Word Processor, Spreadsheet, Presentation, Drawing, Database and HTML document. Other editors include Chart, Image, and Formula. The feature list is huge. For example, the word processor has paragraph styles, tables, fields, auto complete and auto spell-check, thesaurus, the ability to insert charts, OLE objects and Java applets, Index and Table of Contents support, headers, footers and footnotes, versioning, integrated drawing tools,

better. For example, StarSchedule is a server-based calendar that can be shared over a network using HTTP, a trick that is beyond Microsoft Outlook unless you install Exchange. Note that you need the CD version to get the scheduler.

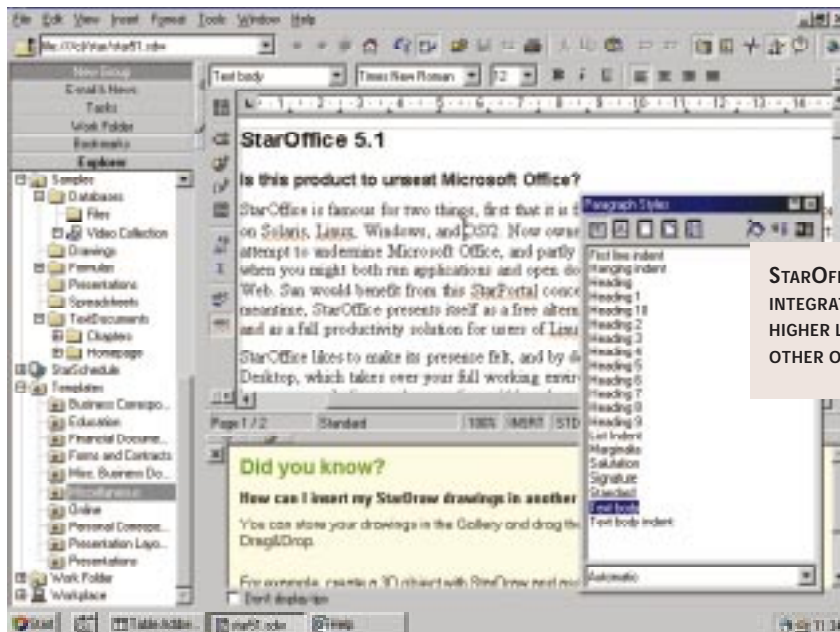
Two big problems with StarOffice are usability and documentation. If you look at the evolution of the major Office suites, you can see that for several years the focus has been more on usability than features. While StarOffice is up to the mark on features, it is well behind on usability. The user interface is too busy, with toolbars and help windows on all four sides of the working area, along with floating, docked and pop-out tools.

There is no shortage of wizards, templates and online tips, but the overall effect is cluttered rather than helpful. In such a feature-laden package, the quality of documentation is critical, and currently it is not at all easy to find your way around. You also have to learn

StarOffice jargon like 'Beamer', which is a window for displaying the contents of a StarOffice element library. Stability is not what it should be, so save your work often.

This is a fantastic package for an unbeatable price, but it does need to mature a little before the typical office user will really want to use it. With a little more development, it has the potential to take on all comers.

TIM ANDERSON



STAROFFICE TAKES INTEGRATION TO A HIGHER LEVEL THAN OTHER OFFICE SUITES

StarOffice likes to make its presence felt, and by default installs with a feature called Integrated Desktop, which takes over your whole working environment. It also offers to become the default browser, email client and news client, which makes sense if you want to move seamlessly between Windows and Linux, for example.

Whether or not you choose the Integrated Desktop, StarOffice takes integration further than other office suites. Instead of offering a suite of applications, it feels like a single application with different document types. If you are working in a text document, and then start a new spreadsheet, you end up with two floating document windows that share

multiple columns, database integration and more. The advanced features are not only present, but implemented thoroughly. Look into paragraph styles, for instance, and you find a dialog with 12 tabs, including control over hyphenation, widows and orphans, drop capitals, and so on. Macro enthusiasts can open the StarOffice programming environment, which uses StarBasic, a language similar to Visual Basic.

This richness of features makes StarOffice ideal for Linux users who want to say 'Anything you can do I can do better'. It also means that in theory organisations could move from, say, Microsoft Office to StarOffice without losing features. Some things are actually

PCW DETAILS



Price Free download, or CD available, currently also free to UK and Ireland residents. Go to www.sun.co.uk/staroffice

Contact Sun Microsystems
01276 451 440 www.sun.co.uk

System requirements Windows 95 or higher, Linux 2.0.x or higher, OS/2 Warp 3 or higher, Solaris 2.5.1 or higher. 64MB RAM and 100MB disk space

Good points Value, number and depth of features, team scheduler, runs cross-platform

Bad points Quirky, cluttered interface, poor documentation and erratic online help, some bugs

Conclusion Still an adventurous choice but nearly very good indeed

Lotus Organizer 6.0

Lighter to carry and **easier to update** than a paper-based alternative, this is fine for personal use.

Organizer is the PIM (Personal Information Manager) that looks like a real organiser, complete with tabs and ring-binder. The advantage is instant familiarity, together with great printing options if you want to stick pages into a paper-based version. On the other hand, it is no longer true that typical PIM users also have paper organisers. The binder look is less compelling than it was, but Organizer remains the easiest PIM to learn.

Its main features are a personal calendar and contact manager, and extras include a to-do list, telephone call manager, notepad, and a new web links organiser. Users on a network can share Organizer sections, with simple password control over permissions. It is also possible to synchronise with a PDA, with support for Palm devices included and other options available.

At version 6.0 you would imagine that Organizer should be pretty good at its core functions, and it is. You can double-click a day in the calendar to create an appointment, and have comprehensive options for reminders, repeating appointments, and setting up meetings with automatic invitations and checking of free/busy time status. The contact manager has plenty of fields available and is easily customised. For example, Organizer has a Zip code field, but using the Custom labels button it is easy to change this to postcode. The History view shows contacts one at a time, alongside an Activities page listing appointments, calls or other notes associated with that contact. These are hyperlinked to their source. Organizer has the essentials for contact management including features like the ability to schedule a future phone call with an automatic reminder.

Existing users will not find dramatic changes in version 6.0. The most obvious new feature is the Web section, where you can store web links including login details for password-protected sites. When the link is clicked, the login details

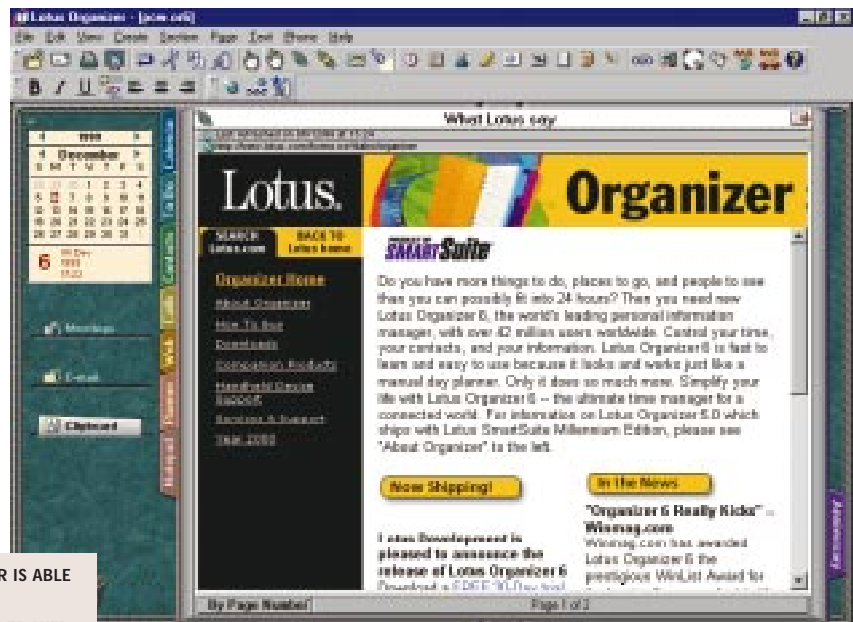
ORGANIZER IS ABLE TO STORE DOWNLOADED WEB PAGES IN ITS NOTEPAD SECTION

are entered automatically. You can also download web pages and store them in the Notepad section. Organizer displays them in its own browser, which seems to use the Internet Explorer control to render content. There is also support for relevant Internet standards, including vCard, vCalendar, iCalendar and LDAP directory lookup. A simple but powerful feature will publish contact or calendar information as web pages, and will republish them daily or at other intervals.

Organizer's EasyClip is a great time-saver. It provides a range of right-click options such as Create Appointment and Create Contact. Typically, you would use this while working in another application, in

which case EasyClip looks at the currently selected text and converts it intelligently. For instance, if you are in a word processor and select the text: 'Buy PCW, 1 March 2000', then EasyClip's Create Task automatically sets this up as a task due on that day.

Organizer comes with SmartCentre, which is a toolbar with links to web-based information along with Organizer's calendar, contacts and reminders.



The problem with a PIM is that it tends either to be in constant use, or not at all. Organizer has a few weak points. Unlike Microsoft's Outlook, it is not an email client, so if you want to flip back and forth between your inbox and your calendar, you need to have two separate applications open. Most of the web features are similar to what is already available in Netscape Navigator or Internet Explorer. Organizer is mainly for personal use, and the network features are weak. Lotus should have followed Microsoft's example and integrated the best features of Organizer into the Notes client.

TIM ANDERSON

A simple but powerful feature will publish contact information as web pages

PCW DETAILS

★★★★

Price £70 (£59.57 ex VAT)

Contact Lotus Development Corporation
0870 600 6123
www.lotus.co.uk

System requirements 486 with
Windows 95, 98 or NT, 16MB RAM,
17MB hard disk space

Good points Easy to learn and use, fun
web links, and comprehensive PIM
features

Bad points No integrated email client,
poor network capability, too much US
content

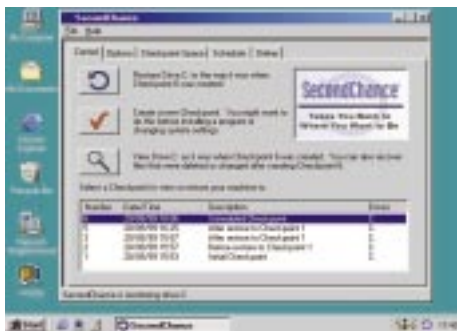
Conclusion Fine for personal use, but
limited if you want to share information

SecondChance 2.0

A utility that can get you **out of trouble**, and take your system back to where you want it to be.

From Powerquest, the company responsible for one of the best utilities ever, Drive Image Pro, comes a product that aims to restore your system to a working state with just a few easy clicks. It is aimed at IS professionals to assist users to restore their own systems, or OEMs to help them with technical support calls, and home users who want to restore their hard drive after installing a new program or changing an important system setting.

It is file, rather than sector-based and relies on a series of checkpoints. A checkpoint is a snapshot of the FAT that is automatically created when you install the program and at various points during the week as defined by you. The program then installs a small VXD in your system tray that monitors any changes you make to your drives. If you delete a file, a backup is placed in the SecondChance directory, which is protected to make it harder to



delete accidentally. If you want to restore your drives, it starts up a 16bit program in DOS. Further checkpoints are created before and after the restore, so you can re-trace your steps if something goes wrong.

The best thing about the package is that it creates copies of any files that are erased during the restoration process. When you re-boot into Windows, you can view these and copy them to their original, or another, location. If you can't boot into Windows, you can use an

emergency boot disk that the program creates to load a 16bit version of SecondChance and restore your drives from there. It is not entirely foolproof: if you totally delete a drive it can't help you, but it is still a very useful utility that would suit any of its intended markets well.

JASON JENKINS

PCW DETAILS



Price £58.69 (£49.95 ex VAT)

Contact Powerquest 01189 755 955

www.powerquest.com

System requirements 486 or higher processor, 20MB hard disk space, 16MB RAM, Windows 9x, CD-ROM drive, 256-colour VGA display

Good points Easy to use, doesn't adversely affect system performance

Bad points Fairly expensive

Conclusion An excellent utility that could be of use to professionals and home users alike, but it comes at a price

PartitionMagic 5.0

If you want to be able to **re-size your disk partitions** without deleting them, this is the one for you.

When the first version of this powerful utility hit the shelves it was revolutionary – before PartitionMagic there was simply no way to re-size disk partitions without deleting them altogether using FDISK. Now on its fifth incarnation, Partition-

Magic is as useful as it always was, but if you're a proud owner of version 4, you'll need a specific reason to upgrade.

The most important new feature is the NTFS to FAT converter which does something that Microsoft claims can't be done – getting Windows 95/98 to read your NTFS data. It is also possible to merge adjacent partitions, whereby one of the drives becomes a sub-folder on the enlarged, merged drive. Improved wizards help you through the process of changing your hard disk, and then boots into DOS to make the changes.

Bootmagic enables you to install more than one operating system and choose which to boot into from a menu at start-up. There's also new support for Linux partitions. Magicmove makes a welcome return in this version and lets you move whole applications between partitions to help free up more space on the original drive.

The interface is easy to use – you can pick applications to move straight off your start menu or browse to find them. The program then scans your hard drive and registry and makes appropriate adjustments.

PartitionMagic is still very impressive. If you don't own a recent copy you should buy one now, but if you do you'll need a desperate yearning for an NTFS to FAT converter before it's worth the price.

JASON JENKINS

PCW DETAILS



Price £59 (£50.21 ex VAT)

Manufacturer Powerquest
01189 755 955

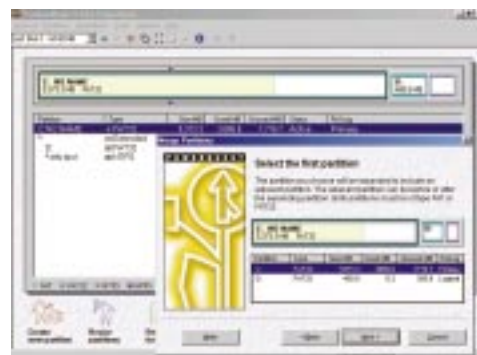
www.powerquest.com

System requirements Windows 3.x/95/98/NT or DOS 5.0, 486 Processor, 16MB RAM

Good points New NTFS to FAT converter, Linux support and the ability to merge partitions

Bad points None to speak of

Conclusion This remains one of the best utilities ever written and it is something you should not be without



McAfee Utilities 2000

A useful suite of utilities with a good interface, but not as reliable as it could be diagnostically.

McAfee Utilities is an integrated collection of some 21 tools designed to play nursemaid to your PC and make maintenance a breeze.

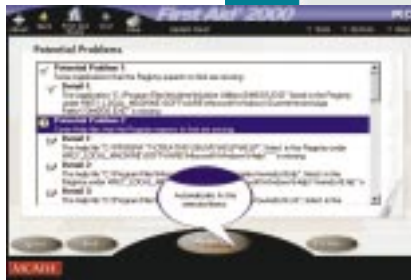
The user interface is very clean and logical. Four areas – Repair & Recover, Clean & Optimise, Prevent & Protect and Secure & Manage – are accessed from a central control panel, with each section in turn home to a handful of utilities. While there is some substantial overlap between their capabilities, each operates as a standalone feature, and this makes targeted troubleshooting easier.

Several of the utilities are really just tweaked or supercharged versions of components found in Windows 95/98. Disk Minder, DiskTune and WinGauge, for example, offer much the same service as Scan

Disk, Disk Defragmenter and System Monitor respectively. However, McAfee's point-and-click approach is more likely to engender a healthy habit of system maintenance than anything in Windows. This suite helps you back up your data, recover from faults, rescue lost or deleted files, speed up your programs, clean up your hard disk, and revert back to safe system settings when things go wrong.

However, matters get a little sticky when you attempt serious diagnostics. Discover Pro, for instance, displays detailed information about your system and runs benchmark tests but misreported our test system's Athlon 600MHz processor as a K6 266MHz. Not a serious problem, perhaps, but enough to cause alarm in the unwary. (Network Associates assures us that a patch to address this issue will be included with future updates.)

Next, we ran a test on our machine's hard disk and were surprised to see it fail. Disk Minder scanned the disk for errors, found no faults and fixed nothing – yet it passed second time around. Puzzling. The system's RAM also 'failed' but this time there was no indication about what this meant or, more importantly, what could be done. We rebooted and ran the



test again, but this time

the entire system froze midway through – at which point, none the wiser, we moved on.

First Aid 2000 – a heavy-duty diagnostic program with built-in repair tools and a pedigree in the field – was rather more impressive. It correctly identified that a scanner and a USB printer were both attached to the machine without any driver software in place, and went on to list a host of 'potential' problems where registry entries and shortcuts appeared to be awry (and this on a machine that had been reformatted – ie wiped clean – not 12 hours before). The AutoFix option rather gratifyingly sorted out the minor problems without any further intervention. On the downside, First Aid went on to suggest that the modem was set to use a port to which it was not attached – a diagnosis that was neither helpful nor, in fact, true.

We did get some good results from Crash Protector – which gives you a chance to save your work on the point of an application crash. Other reasonably useful features include a file shredder for doing away with sensitive data, a registry editor that tweaks your system settings for maximum performance, and several 'How Do I?' videos. McAfee even throws

THE INTERFACE IS USER FRIENDLY AND SHOULD MAKE RUNNING REGULAR HEALTH CHECKS EASIER

in a Zip utility and a Y2K hardware checker (perhaps a little late in the day?) for good measure.

All in all, a mixed bag. As a rule, utilities come under the category of occasionally useful rather than essential. Until software develops real intelligence – and, in particular, the ability to think laterally – technical support teams have little to fear. That said, there's plenty here to help you get to know your PC a little better, and a regular maintenance programme never hurt.

KYLE MACRAE

PCW DETAILS

★★★★

Price £24.95 (£21.23 ex VAT)

Contact Network Associates
01753 827 500

www.mcafee.com

System requirements 486 processor (Pentium recommended), Windows 95 or 98, 16MB RAM (32MB recommended) Min 32MB hard disk space (max 100MB for full installation)

Good points Logical approach to utility organisation and a pleasantly intuitive interface

Bad points Not as reliable in diagnostic mode as it would have you believe

Conclusion Not quite up there in the must-have stakes but nevertheless a well-appointed suite of handy utilities – and decidedly good value for money



Online vs offline email

Weighing up the practicalities of **cost versus convenience** unearths some surprising facts.

Mention killer applications for the Internet and most people will say the world wide web. But let's not forget that this worldwide network of computers allows us to transport messages – or just a discrete bit of gossip to the person at the desk opposite – from one side of the planet to the other in a blink of an eye.

We're talking, of course, about email, the ubiquitous messaging service that the world and its dog has adopted. Many people now prefer to avoid being disturbed by phone calls and make their communications via email instead, and as far as faxes are concerned – well, they're so Eighties daaahhling!

Since it goes without saying that you use email, why is it the subject of a *Head to Head*? The question we're asking is whether should you send and receive messages in a batch and browse them

offline without incurring connection charges, or should you dump hefty offline clients in favour of lean, portable online web-based services? In Microsoft terms, it's Outlook vs Hotmail, but many others are joining the battle for your messaging services.

Speed

As any Internet user knows, the speed at which any operation occurs is determined by several variables, and the fastest local plumbing in the world can be blocked by a busy server elsewhere.

Such unknown conditions plague email of all flavours, but perceptions of speed vary considerably between offline and online email services. An offline client may seem to take an age to send and receive messages, but once the process is completed, they're all there for you to browse through at your leisure.

You may often find yourself flicking between messages to cross-reference information, and since the messages reside on your local disk, this operation is almost instantaneous.

Online services, however, present you with your inbox of subject headings and await further instructions. Clicking on a message results in a pause while your command crosses the Internet, accesses the server and returns with the desired information. It's usually only a matter of two or three seconds, but if you're used to reading offline, even this short pause can be infuriating.

Interestingly, this situation doesn't seem to perceptibly improve when accessing current online services through a high-bandwidth leased line instead of a paltry 56K modem. So, in this first round of speed perceptions, the score is one-nil to offline.

Capacity

The actual text in email messages may only be as small as a few hundred bytes, but watch out for all those pesky attachments. Even a well-trimmed inbox could measure 50MB, and over 100MB is not uncommon.

If you download your messages onto your own PC, you decide how much capacity is on offer; in theory it could be the size of your entire disk. However, anyone who uses online email services, or stores their messages on their firm's server will be told by the MIS department as soon as they've reached their limit. In Excite's case, the limit per user is 3MB.

To be fair, capacity is very much down to how you use your services, as online messages can be copied onto



POP3 ON HOTMAIL MEANS YOU CAN POP INTO AN INTERNET CAFE AND PICK UP YOUR EMAIL

your local disk, and offline clients can be instructed to leave messages on your ISP's or company's server. In general, however, offline clients are normally setup to move messages from the server to your local drive, and online services usually hold them remotely. In this set up, offline wins a capacity point.

However it's worth mentioning backup. Online messages are stored on a machine that could serve hundreds of thousands of accounts – so it's almost certainly backed up regularly, and your messages are safe whatever happens to your local machine. Downloading messages onto your local drive means that you're responsible for them. That means a draw in this round.

To find your messages locally, this is where you'll need to look. Outlook Express users will find the all-important MBX and IDX files in Windows/Application Data/Microsoft/Outlook Express. The Microsoft folder also contains your address book, labelled WAB. Netscape mail users will find their messages in Program Files/Netscape/Users/yourname/mail – don't forget to back up this entire folder. Users of full

Outlook will find the all-encompassing PST file in Windows/Local settings/Application Data/Microsoft/Outlook. Back this up too!

Features

You'd think an offline client would crush an online service in terms of features, but things are pretty even. You can attach an automatic signature to messages on both systems. You needn't worry about attachments either, as both online and offline services handle them with ease. You can also set up filters to block unwanted email from individuals or entire companies – but remember that in the case of offline readers these

unwanted messages are normally deleted only after you've spent money downloading them.

Email is, of course, no good

without a set of addresses, and contacts are managed very effectively by an offline client. However, online services such as Excite and Kerbang also offer contact storage and management. Both online and offline users can also keep messages from regular contacts in their inbox, and use replies to these as a

lazy way of maintaining an address book.

Excite takes the Application Service Provider (ASP) model even further by offering importing of contacts and online management of schedules – it'll



EXCITE PLANNER ALLOWS YOU TO KEEP ALL YOUR CONTACT DETAILS SYNCHRONISED

even synchronise with your handheld PDA. You may be able to customise the appearance of an offline client better, but in this round of features, it's a draw.

Cost

So how much does it all cost? In terms of software, very little. Web browsers are all that's needed to access the interface of an online service, and both Internet Explorer and Netscape Navigator also come with competent offline POP3 email clients – all at no cost.

In terms of the actual service, most online email is free – simply go to Hotmail, Excite, Yahoo or any other supporting website, and sign up for nothing. You'll need an ISP to get on the web in the first place, and most of these offer a POP3 service as part of the package – and the package these days is often free. However, users of online email tend to spend longer connected to the Internet, and if you pay for this

Blurring the distinctions

Just when you think you've got offline and online email services separated, something comes along to confuse the issue. A quick browse around the online web HTTP email services such as Hotmail and Excite will reveal POP3 account options. Enter your three basic POP3 account details (incoming mail server, account name and account password), and you'll be able to access your POP3 messages and attachments.

This is a boon for anyone who relies on their POP3 account for messaging, but has no offline client to hand. Simply find a device with a web browser and you're sorted, whether it's in an Internet café or someone else's office. Most web email services offer additional options to leave your messages on the POP3 server, so you can download them onto your offline client inbox later. You may also want to change the 'reply-to' option to your

POP3 address, so any messages you respond to with a web service will eventually get back to your main account.

If you use web-based email regularly, it can be a pain to check your messages separately to those sent to your offline client. Outlook Express 5 lets you retrieve HTTP messages in the same way as with POP3 accounts; it'll even set up a Hotmail account for you. Sadly, full Outlook does not currently support this.

connection, then it'll work out more expensive.

On the hardware side it's a different story. An offline client such as Outlook Express usually runs on a proper PC, whereas an online service needs only a web browser. This could run on a fully-fledged PC, or on a much less expensive information appliance such as a games console or set-top box. Another draw.

Portability

The fact that an online service keeps your messages on a remote server means that you can access your inbox from anywhere in the world – and with an interface that looks familiar regardless of what device is used. You choose an email address and carry it around with you, safe in the knowledge that you can retrieve messages from anywhere, without the need to lug around or own your own computer. This is a simple, but crucial, empowering win for online services.

Perception of quality

Any service that's free to the user must make its money elsewhere, and that's normally by advertising. Since all the popular online email services are free, you'll have to put up with some advertising above your inbox, and often an additional signature pasted below every one of your sent messages saying how 'you can get a free account too'.

Call us Internet snobs, but there is a

When in roam

Everyone loves to get a postcard, but they do take a long time to arrive. However, by using email you'll be able to tell friends back home in a matter of seconds that the weather's lovely and you're having a great time. But who wants to take a computer with them and worry about foreign ISPs and call charges?

The answer is free

web-based HTTP mail services such as Hotmail and Excite. Because your account details and messages are held on a central web server, you can access them from any web browser, whether it's in a cyber café on the Khao San Road, or on a colleague's PC in another office. Simply borrow someone else's PC, or rent one for half an hour in a cyber

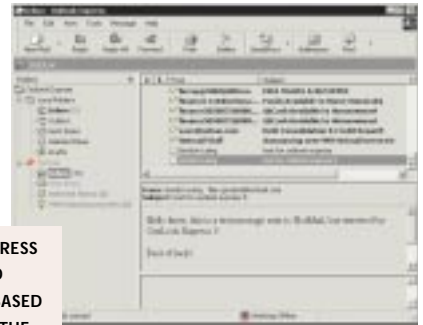
café and you're back in touch.

It's remarkable to see how cyber cafés have taken off, even in underdeveloped areas – wherever there's a traveller, you'll find a web browser nearby. See our box on blurring distinctions on the previous page to find out how to retrieve your POP3 messages on web services too.

certain cheapness to all of this, and while it's perfectly acceptable if you're travelling or on a strict budget, free online accounts just don't give the right impression in business. This also applies to offline accounts that are given away with free ISPs.

If you want to avoid adverts, or register your own domain name, or use one from an ISP that gives a better impression, then you're going to have to pay for a POP3 service at the moment. To eliminate any advertising signatures, you'll also need to manage your email from an offline client.

OUTLOOK EXPRESS LETS YOU READ YOUR HTTP-BASED MAIL IN MUCH THE SAME WAY AS POP3



Conclusion

Anyone who's been keeping count will have noticed that offline has fractionally beaten online by a single point. It should really be a draw, as any regular user of email will find justifiable reasons for using both types of services.

It is interesting that they're currently complementary, particularly when you consider how differences are becoming blurred – see box on previous page. We would urge everyone to set up a free online account simply so that they are able to email from anywhere there's a browser; the ability to access POP3 services online too is liberating for anyone used to carrying a notebook around just to keep in touch.

While most people feel happier today with offline clients, the long-term trend is heading towards online ASPs. By hosting your email remotely, you let someone else worry about storage, backup and administration. If your PC dies, you lose your notebook, or you're outside your home or office, you can still access your full account wherever there's a web browser. Busy free online accounts may have given us the wrong impression of the quality that an ASP can supply, but believe us, they are the way of the future.

GORDON LAING

SMS the email alternative

With a permanent connection to the Internet, you can enjoy regularly polling for messages and seeing them pop up the instant they've arrived. But is this possible in a mobile environment?

The Short Message Service, SMS, offers an almost instant text-messaging solution to GSM mobile phones. The messages may only be a maximum of 160 characters each, but that's plenty to set a time and place for meeting.

The beauty of SMS is that messages generally

take less than five seconds to get from one mobile to another – anywhere in the world where there's service. You don't need to dial up to see if any are waiting, as they immediately appear on your screen and all at no charge to the recipient.

When you're abroad, avoid expensive phone charges by sending text messages instead. On a recent trip to the US, I was charged almost £1 per minute for voice calls, but still only 6p for every text message.

There are already gateways that convert

emails to SMS for phone delivery and vice versa. Several websites offer text messaging services to mobiles – check out www.orange.co.uk for sending messages from any web browser to an Orange phone.

WAP-compliant mobiles will soon feature POP3 clients to directly access your proper email. At first this will still need a dial-up operation, but within a year packet services for mobile phones will allow them to be permanently connected to the net, with all its instant messaging benefits.

Bestbuys

ENTRY-LEVEL PC

Dell Dimension XPS T500



This is an ideal entry-level machine featuring a 500MHz Pentium III processor, 128MB of RAM and a 13GB Maxtor hard drive. Graphics are taken care of by a Diamond Viper V770 card which drives a 17in monitor. Dell has even thrown in an HP Deskjet 610 printer and a copy of Microsoft Works Suite 99 for good measure.

Review February 2000, p140 **Price** £1,173.83 (£999 ex VAT)
Contact Dell Computers 0870 152 4850 www.dell.co.uk

MID-RANGE PC

NEC Direction SM-733P



Built on an 820 chipset, this speedy machine uses the 0.18micron 733MHz Pentium III. It comes with a single 256MB DIMM for memory and a Guillemot 3D Prophet graphics card with 32MB on-board. For storage, a Zip 250 drive and a 27GB Maxtor UDMA66 hard drive are included alongside the Pioneer DVD-ROM. You also get a large 19in monitor for your money.

Review March 2000, p71 **Price** £1,937.58 (£1,649 ex VAT)
Contact NEC Direct 0870 010 6324 www.necdirect-europe.com

HIGH-END PC

Evesham Athlon 750



Built around the Athlon 750MHz processor and 128MB of RAM, this PC isn't just about raw speed, you also get great features. Included are VideoLogic's DigiTheatre surround sound speakers, the Guillemot 3D Prophet graphics card, a 19in Taxan ErgoVision 980 monitor and Miro's Studio DC10 Plus MPEG capture card, a 27.3GB hard drive and a CD-RW drive.

Review March 2000, p150 **Price** £2,466 (£2,099 ex VAT)
Contact Evesham Micros 0800 0380 800 www.evesham.com

HIGH-END NOTEBOOK

Hi-Grade Notino AS7400



Hi-Grade has pushed back the boundaries of mobile computing with the first Pentium III-equipped notebook. Besides being one of the fastest mobile computers we've ever seen, the AS7400 is fully featured with 160MB of RAM, a 10GB hard disk and a DVD-ROM drive. If you're looking for a high-power desktop replacement, this is it.

Review December 1999, p73 **Price** £2,113.82 (£1,799 ex VAT)
Contact Hi-Grade 020 8532 6100 www.higrade.com

MID-RANGE NOTEBOOK

Dell Inspiron 3700



With its Celeron 466MHz processor, 128MB of RAM and 14.1in active matrix LCD screen, the Inspiron 3700 is not only light, it also looks great. The bundled Margi DVD-to-Go PC Card lets you watch DVD movies on a television, while Dell's exclusive ExpressCharge cuts the lithium ion battery's charging time in half, with no detrimental effect on its operational life.

Review January 2000, p77 **Price** £1,701.40 (£1,448 ex VAT)
Contact Dell 0870 907 5681 www.dell.com

ULTRA-PORTABLE NOTEBOOK

Sony Vaio 505X



The 505X has a very thin casing but still packs in a Celeron 333MHz processor, 64MB of RAM and a 6.4GB hard disk. A screen resolution of 1,024 x 768 offers crystal-sharp images and text. Peripherals can be connected via the built-in USB and FireWire ports or Type II PC Card slot. The 505X is a great evolution of the ultra-portable notebook format.

Review January 2000, p75 **Price** £1,702.57 (£1,449 ex VAT)
Contact Sony 0990 424 424 www.sony.com

DIGITAL CAMERA**Nikon
CoolPIX 700**

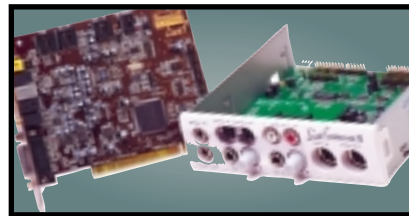
Both physical controls and the on-screen menu system are well laid out and the results from the 2.1 megapixel CCD are impressive – wonderfully clean, detailed, natural-looking images at 1,600 x 1,200.

Review January 2000, p175 **Price** £499 (£425 ex VAT)
Contact Nikon 0800 230 220 www.nikon.co.uk

WEBCAM**Creative
WebCam Go**

Not only is this a regular webcam offering 30fps at 352 x 288 or 15fps at 640 x 480, but when you disconnect the USB cable it becomes a standalone digital camera that can store JPEG images on its internal 4MB memory.

Review March 2000, p78 **Price** £119 (£101.28 ex VAT)
Contact Creative Labs 0800 973 069 www.europe.creative.com

SOUND CARD**Creative Labs
SB Live! Platinum**

This is exactly what gamers and budding PC musicians have been asking for – great sound quality and excellent bundled software make it a winner. We think it's the best sound product ever.

Review February 2000, p83 **Price** £167 (£142 ex VAT)
Contact Creative Labs 0800 973 069 www.soundblaster.com

COLOUR INKJET**Hewlett-Packard
DeskJet 895CXi**

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced.

Review October 1999, p177 **Price** £210.32 (£179 ex VAT)
Contact Hewlett-Packard 0990 474747 www.europe.hp.com

BUDGET LASER PRINTER**Brother
HL-1250**

This compact machine has everything you could reasonably ask for at the price, but Brother has gone one step further with the inclusion of both parallel and USB ports.

Review February 2000, p165 **Price** £245.58 (£209 ex VAT)
Contact Simply 08707 297 366 www.brother.com

COLOUR PHOTO PRINTER**Epson
Stylus Photo 750**

Easy installation, a five-colour cartridge for photo printing and feature-rich software make this printer attractive. Its photo reproduction could not be faulted and job turnaround is fast.

Review October 1999, p180 **Price** £199 (£169.36 ex VAT)
Contact Epson 0800 220 546 www.epson.co.uk

BUSINESS LASER PRINTER**Hewlett-Packard
LaserJet 4050TN**

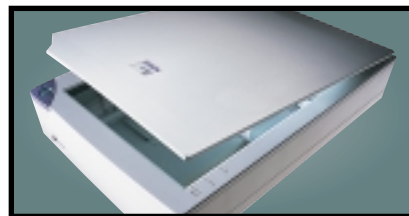
The 4050TN's 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16MB of RAM it can turn out 16ppm. It also comes network-ready as standard.

Review September 1999, p96 **Price** £1,580.38 (£1,345 ex VAT)
Contact HP 0990 474747 www.europe.hp.com

MULTI-FUNCTION DEVICE**Hewlett-Packard
Office Jet R45**

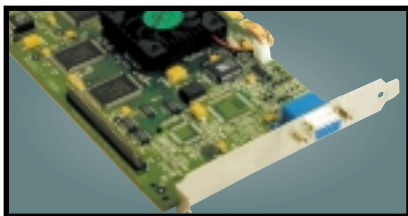
A 600dpi colour inkjet printer, colour scanner and a fax all in one. Colour output is rich and vibrant. The 30bit scanner supports a maximum optical resolution of 600dpi.

Review November 1999, p96 **Price** £478.23 (£407 ex VAT)
Contact Hewlett-Packard 0990 474747 www.europe.hp.com

FLATBED SCANNER**Epson
GT-7000 USB**

This 600dpi scanner has good colour accuracy, text reproduction and picture quality. USB installation is a breeze and we were impressed with the robust build quality.

Review November 1999, p191 **Price** £149 (£126.81 ex VAT)
Contact Epson 0800 220 546 www.epson.co.uk

GRAPHICS CARD**Creative Labs
Annihilator Pro**

Based on the DDR version of the GeForce 256 chipset from nVidia, this card offloads transform and lighting effects processing from your CPU to give outstanding results.

Review March 2000, p80 **Price** £218 (£186 ex VAT)
Contact Creative Labs 0800 973 069 www.europe.creative.com

EIDE HARD DRIVE**Seagate
Barracuda ATA 28GB**

This 28GB beast's spin speed of 7,200rpm helped it achieve 0.89Mbytes/sec in our random read and write test. It's a breeze to install and the £5.10 cost per MB makes it a bargain.

Review April 2000, p197 **Price** £168 (£143 ex VAT)
Contact SMCdirect 01753 550333 www.seagate.com

SCSI HARD DRIVE**Seagate
Barracuda ST150176LW**

The Barracuda may no longer be at the cutting edge of SCSI performance, but with its 7,200rpm spin speed and 50GB storage space its value for money is outstanding.

Review April 2000, p202 **Price** £645 (£549 ex VAT)
Contact SMCdirect 01753 550333 www.seagate.com

SLOT 1 MOTHERBOARD**Supermicro
Super PIIISCA**

Targeted at people looking to upgrade their systems, this board includes both DIMM and RIMM slots. The documentation is excellent, and all the necessary cables, RIMM spacer and driver CD are included in the box.

Review March 2000, p186 **Price** £128.08 (£109 ex VAT)
Contact Dabs Direct 0800 138 5124 www.supermicro.com

SLOT A MOTHERBOARD**Gigabyte
GA-7IX**

This board has four PCI slots, one ISA and one shared slot. It was very stable in our tests and the manual spells out clearly what the jumpers do and takes you through each of the Award Modular BIOS settings step by step.

Review March 2000, p182 **Price** £105.75 (£90 ex VAT)
Contact Dabs Direct 0800 138 5214 www.gbt-tech.co.uk

SOCKET 370**Abit
BP6**

The BP6 allows you to use Intel's socket 370 Celerons in a dual-processor configuration. Even if you only use the board for a single processor, the BP6 still shines because it is one of the few Socket 370 boards to use the BX chipset.

Review March 2000, p195 **Price** £116.33 (£99 ex VAT)
Contact Top PC 0113 2422 416 www.abit.com.tw

17IN MONITOR**CTX
PR711F**

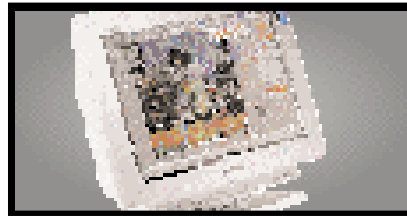
Using a Sony FD Trinitron tube, this monitor's slim casing somehow makes the display seem larger. Image quality is superb and a USB hub is built in to the base as standard.

Review January 2000, p79 **Price** £276.12 (£235 ex VAT)
Contact CTX 01923 810800 www.ctxeurope.com

19IN MONITOR**Taxan
Ergovision 980**

Based on the 19in Mitsubishi Natural Flat Diamondtron tube, this offers superb image quality and comprehensive OSD. There's also a built-in USB hub.

Review November 1999, p208 **Price** £556.95 (£474 ex VAT)
Contact Taxan 01344 484646 www.taxan.co.uk

21IN MONITOR**Sony
GDM-F500**

Sony's flagship monitor has a 21in FD Trinitron tube and excellent image clarity. Its aperture grille pitch is just 0.22mm and it can achieve a resolution of up to 1,880 x 1,440 at 80Hz.

Review April 1999, p189 **Price** £1,292.32 (£1,099 ex VAT)
Contact Sony 0990 424424 www.sony.com

LCD MONITOR**Sony
Multiscan CPD-L181**

This 18.1in TFT monitor produces a flawless image at a resolution of 1,280 x 1,024. The auto button makes setup a breeze and the dual-VGA inputs are an added bonus.

Review November 1999, p95 **Price** £2,461.63 (£2,095 ex VAT)
Contact Sony 0990 424424 www.sony.com

SOUND SYSTEM**Videologic
DigiTheatre**

This set includes five speakers, a subwoofer and an integrated six-channel amplifier plus a decoder. Excellent sound quality at a fair price make the DigiTheatre a must-have.

Review January 2000, p81 **Price** £249 (£211.91 ex VAT)
Contact Videologic 01923 277 488 www.videologic.co.uk

CD-RW**Creative CD-RW Blaster
CD Studio**

This sterling package includes the 4 x 4 x 24 EIDE CD-RW drive and everything you need to mount it in your PC. Bundled software includes the Nero Burning ROM CD writing program.

Review March 2000, p84 **Price** £175 (£149 ex VAT)
Contact Creative Labs 01189 344 744 www.europe.creative.com

ISDN TA**Eicon
DIVA USB**

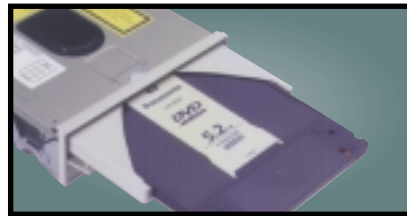
Weighing in at 70g and no larger than a mouse, this USB ISDN TA opens up 128Kbits/sec bandwidth and supports G3 and G4 faxing as well as a variety of voicemail and file transfer facilities.

Review March 2000, p87 **Price** £99 (£84.35 ex VAT)
Contact Eicon Technology 020 8967 8000 www.eicon.com

BACK-UP**OnStream
SC30**

The SC30 has a 30GB compressed data capacity and using Backup Exec it achieved over 70MB/min. Echo software provides drive-letter access so you can treat it like a hard drive.

Review September 1999, p102 **Price** £233.82 (£199 ex VAT)
Contact OnStream 0800 328 1204 www.onstream.com

REMOVABLE STORAGE**Panasonic
LF-D101 U**

This unit not only reads CD-ROM and DVD-ROM discs, but it also writes to PD and DVD-RAM discs, offering safe and affordable high-capacity backup.

Review October 1998, p98 **Price** £391.71 (£333 ex VAT)
Contact Dabs 0800 138 5204 www.panasonic.co.uk

Working late in the lab...

PROFESSOR ANDY HOPPER IS A BIT OF
A HIGH FLYER AS FAR AS COMPUTER
RESEARCH IS CONCERNED – AND IT'S
NOT JUST DOWN TO HIS CESSNA 210.
JOHN MURPHY FINDS OUT MORE...

FLYING TO THE ARCTIC CIRCLE in a light plane just to test your satellite phone is the sort of thing that gets you known as a nutty professor. It is also the sort of thing that makes Cambridge University Professor Andy Hopper popular with his undergraduate students.

But what keeps him in favour with the university authorities is his extraordinary knack of pulling in huge amounts of industrial sponsorship for research. If venture capital for spin-off companies is included in the overall figure, he has brought in over £120m to Cambridge. For that he can be as nutty as he likes. Hopper has also transformed the private lab he founded over 15 years ago from the Olivetti Research Laboratory to the AT&T Research Laboratory, bringing the resources of a £31bn corporation with over 100,000 employees to bear on a very grateful engineering department.

The lab is currently working on a number of cutting-edge technologies. Many of these projects sound far-fetched, but the idea is not to create products, but to set research goals with spin-offs coming from what the team learns on the way to achieving those goals.

For example, Hopper has been interested for some time now in the idea of a computer network which is constantly aware of the positions of users and facilities. From this interest sprung the Active Badge system which monitors where everyone in a building is at any time so that phone calls can be diverted to the nearest telephone extension.

Hopper's lab has further developed this idea into what it calls Sentient Computing. Researchers walk around with badges that sense where they are and which way they are facing. As

they approach a computer terminal their computer desktop appears on the screen without them having to touch the computer. The lab has even taken this idea a step further by having the computer plot staff movements in real time. The laboratory wall has a massive screen on which the computer recreates the room as a 3D image. As people move around the room their ghostly computer image moves on the screen.


But more intriguing is the way the computer can be made to create virtual buttons and devices anywhere in the room. For example, the computer can be programmed so that if someone touches a piece of paper on the wall, it will turn the lights on and off. A different part of the wall can be designated as a whiteboard and monitored by a video camera so that anything written on it is recorded in digital form.

Another area of research is thin-client computing. In fact researchers have already developed one of the thinnest clients available. Weighing in at just 200KB, the client acts as a display for software running on a server. The server only sends the pixels that make up the screen image to the client device. Hopper's office is particularly quiet because there are no disks spinning anywhere on the floor. Terminals on his desk can bring up his desktop from a server elsewhere on the network. The bandwidth required is so low that it can easily be sent over the Internet or over a normal telephone line. A researcher wanting to work from home can simply log in to the lab's server over a phone line and have the same access to that server as someone sitting next to the machine.

As a development of this idea, the lab's researchers have stuffed this thin client into a phone. Using the telephone's special built-in display, the user can read faxes or emails, surf the web or even control domestic appliances.

In fact, when AT&T chairman and CEO Mike Armstrong flew in from the US to attend the official re-opening of the lab in July last year, this was the device that most impressed him.

Armstrong liked it so much he wanted to demonstrate it to Bill Gates at the annual Sun Valley, Idaho conference of the top 300 business leaders in the US, and now about 100 of these special phones are being built to be tested at the Cambridge facility and AT&T's labs in the US.

A full-page photograph of a man with glasses, wearing a dark sweater and dark trousers, standing in a room. He is looking towards the left. Behind him is a large window with a grid pattern, and to his left is a white wall with a white bowl-shaped light fixture. The lighting is soft, coming from the window and the light fixture.

The fact that Armstrong was so impressed with the research being carried out at the lab has given Hopper a certain amount of untouchability within the company for the time being. In fact, much of Hopper's success over the years can be put down to the way he manages the divide between the academic and commercial worlds. His early work on advanced networking technologies such as the Cambridge Ring and ATM gives him a lot of credibility within the academic world, while his ability to sell the benefits of research to large companies has impressed the commercial world.

'The monolithic model of research does not work any more,' said Hopper, referring to the way many companies are doing more research in-house, but at the same time sub-contracting parts of that work to university facilities. Universities are also being more fluid about their approach to research, with many starting to nurture spin-off companies when a development in their labs turns out have commercial potential.

'Things go in and out of companies and universities several times before they emerge as products. What we need is a way to manage this process and keep things under control,' he said.

When the lab was owned by Olivetti, the Italian office equipment giant never brought any of its inventions to market itself. Instead it covered its investment and made a healthy profit from taking shares in spin-off companies. But because much of the research work is concerned with advanced networking there is more of a chance of products emerging directly from AT&T this time around. This is also likely to better suit Hopper's approach to technology development.

According to Steve Furber, a one-time colleague of Hopper at Acorn and now ICL Professor of Computer Engineering at

Manchester University, Hopper has a natural ability to work between the academic and corporate worlds. Hopper and Furber worked together in the early days of Acorn. Furber did the hardware design of the BBC Micro while Hopper turned it into VLSI chip designs.

'Managing academics has often been described as being like herding cats. They are always wanting to head off in their own directions and it's difficult to get them working towards a common objective. Andy is a very good cat herder. He knows how to create a comfortable environment for academics while keeping a commercial focus,' he said.

While working in Hopper's lab may look like a comfortable billet, it does have its own pressures. Salaries are generally higher than the academic world and the equipment budgets are more generous, but the peer pressure

associated with working in such a group can be considerably greater than any commercial pressure that is imposed in the industrial sector.

'When you are working in that kind of environment the pressure is enormous,' Furber said. 'You are surrounded by very good people and if for any reason you were not performing you would stick out like a sore thumb.'

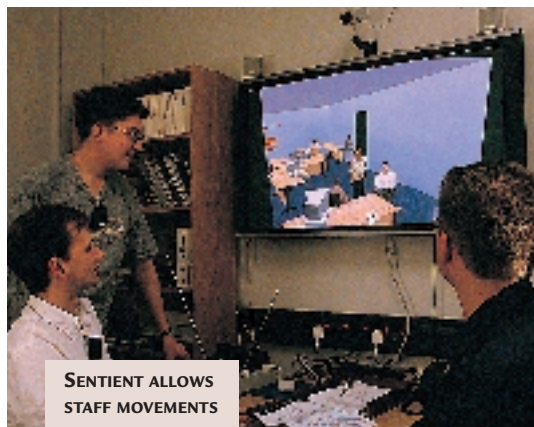
Despite his obvious academic abilities, Hopper says he was only an average student at school, getting mostly Cs in his A Levels. It was only when he reached university and discovered his 'sweet spot' in computer engineering that his academic career really took off. There he worked on the Cambridge Ring project for his PhD thesis and almost immediately got commercial sponsorship to continue his work.

A significant amount of the technology behind the Cambridge Ring became part of the Asynchronous Transfer Mode (ATM) networking technology which is now used by most of the major telecoms companies.

Ever since this initial funding, Hopper has kept a keen eye on the commercial side to his work. The result is that he is significantly better off than the majority of other academics. Hence the aeroplane.

This summer he headed off in his single-engine Cessna 210 to the far north of Canada. He landed at a military base at the northern tip of Grant Island, which is so far north he was able to fly over the Magnetic North Pole. The purpose of the expedition was to test his Iridium mobile phone, which worked fine despite being on the extreme edge of the system's coverage.

With Iridium having filed for bankruptcy protection, he might be the first and last person to use his phone at the Magnetic North Pole. But his research work will guarantee that is not all he will be remembered for.



SENTIENT ALLOWS STAFF MOVEMENTS TO BE PLOTTED IN REAL TIME



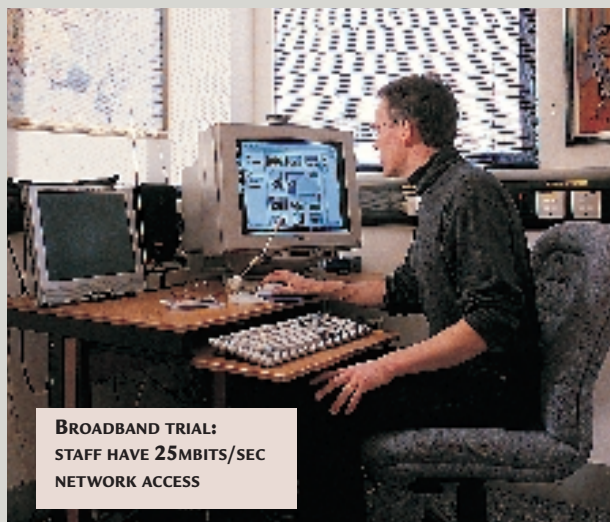
AT&T'S CHAIRMAN WAS IMPRESSED BY THE LAB'S THIN-CLIENT PHONE

AT&T Labs tune in to radio and microwaves

Imagine a tiny radio receiver that uses hardly any power and can be put in any device ranging from a household appliance to a door sign. Although largely overtaken by the new Bluetooth wireless standard, the PicoNet device is designed to use so little power that it can run independently for many years. All the rooms at the AT&T Labs have electronic door signs, which means when someone moves office the name on the door is changed by radio.

Broadband trial

Hopper's lab also developed a combined microwave 'dish' and associated electronics for broadband networking in a package the size of a book. As part of a trial, these are being positioned on the roofs of buildings around Cambridge to give 25Mbps/sec network access to staff and other people involved in the trial. The experiment is trying to discover what people would use bandwidth for if they had broadband access in their home.



BROADBAND TRIAL: STAFF HAVE 25MBITS/SEC NETWORK ACCESS

SALES E-COMMERCE

SELLING ONLINE NEEDN'T BE AN EXPENSIVE OR COMPLEX BUSINESS. HERE, NIGEL WHITFIELD PRESENTS THE DEFINITIVE GUIDE TO SETTING UP SHOP ON THE INTERNET.

CARD TRANSACTIONS

WEB

SHOP

MERCHANT ACCOUNT

WHEN THE PRIME MINISTER starts championing e-commerce as the way forward for small businesses, most technically literate people will greet the news with a healthy dose of scepticism. What does a man who struggles to type his name on a keyboard know about the vagaries of online selling? Nevertheless, it would be foolish to think that small

businesses can't have their space in the online super-shopping mall.

Those thinking of making the move into electronic retailing need to be aware that going online isn't a sure-fire way to make money - if you don't have a workable business plan, just putting it on the Internet isn't going to suddenly transform it into a money spinner. You might find that selling your wares online



MERCHANT SERVICES FIRMS, SUCH AS BARCLAYS MERCHANT SERVICES WILL MAKE YOU OPEN AN ADDITIONAL MERCHANT ACCOUNT FOR INTERNET TRANSACTION

makes you more money, and it could lift a struggling business out of the doldrums, but that's more to do with the increased audience and marketing possibilities. In short, don't believe the hype.

That caveat aside, how do you put your business on the web? The first stage is a website and, as with any site, you need to make sure that it's well designed and hosted on a reliable server – doubly important if it's a source of income, rather than just a marketing tool.

What exactly is an ecommerce site, though? Broadly speaking, there are two ways you can sell online. The first – and simplest – is a straightforward 'catalogue' site, with a list of products and an order form, or ordering information, so that people can place orders by post, sending a cheque or cash.

The problem with this sort of approach, of course, is that it's not very 'spur-of-the-moment'. If people are surfing with a credit card in their hand, and can just type in the details, they're much more likely to buy than if they have to print out a form and trot down to the post box with it.

The key to successful selling online then, is to

make it easy for your customers to do everything online, including arranging payment. And that means that you need to accept card transactions, whether they be by debit, credit or charge cards. Even if you already take credit cards in your business, you'll find that there are a lot of issues to consider, and it's the options surrounding processing the payments that form some of the most important issues you'll need to consider if you want to set up a real ecommerce website.

Merchants

While taking cards in a shop may seem simple – even to the point of just using a mechanical machine to take an impression – there are many more things to bear in mind when you want to accept payment online.

The first hurdle for many people will be to become a merchant, which is the term the card companies use for those with whom they have an account. Even if you already have merchant status for offline transactions, all the major merchant services firms, such as Barclays Merchant Services and NatWest Streamline, will make you open an additional merchant account for Internet transactions, so that they're kept separate from ordinary ones. The merchant services firm processes card payments for you, accepting a number of cards, including both debit and credit cards – you don't need to sign up with more than one.

Signing up is a fairly straightforward process, but there are some things to be aware of. For example, if you're a sole trader with a small business, you might put everything through a personal bank account. But to become a merchant, you'll need a business account – which means convincing a bank to open one for you. And you'll have to convince the merchant services company that you're worth the risk, too.

Since consumers in the UK can claim against their credit card company if they order goods that don't turn up, or if a firm goes bust after charging their card, it's important that the card companies are sure you will honour orders and aren't likely to go bust, leaving them to pick up the bill. They'll often want to see a business plan, including projections of the amount of money you expect to be taking over the Internet, before agreeing to grant you merchant status. You may find that a new business will have an even harder time if you don't have any proof on paper that you really are making money already.

If you can't overcome the hurdles of signing up as a merchant, don't give up! There are other options open to you, including malls and bureaux. Both are ways of allowing you to take orders online, without having to set up as a merchant – although, they'll have their own requirements before letting anyone use them.

A mall type of service is much as you'd expect:

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It offers you the opportunity to place your products in an established online shopping area. There aren't many of these systems, and they'll often have restrictions on what sort of things you can offer. Some, for example, are aimed simply at helping charities to collect donations online, while others just allow you to add your own items to a catalogue on a site.

A bureau service, on the other hand, integrates with your own website, allowing you to process transactions, often with the actual ordering page hosted on its server, but leaving everything else up to you.

Both approaches have their pros and cons, and many of the options include elements of both. Most noticeable of all, is that you'll be paying an additional fee for the services, on top of whatever percentage the merchant services, such as Streamline, would have charged you.

The catch is in the margin

It's the fees that can be the killer; if you're a business that's used to processing card transactions, you'll be familiar with the charges. For those coming fresh to the world of card payments, perhaps having dealt via mail order and cheques, or starting out from scratch, the high levels of commission may be something of a surprise – especially if you're selling things that don't cost very much.

Maximum fees for processing transactions via a merchant service are typically five per cent for credit cards. For debit cards, you may instead pay a flat fee – and that's not far short of a pound. So if you're planning on selling things that cost only a couple of pounds, you won't want to be accepting Switch cards!

While the merchant services fee is all you have to pay when you opt for the traditional ways of processing transactions – including simply typing card details gleaned from the website into an EPOS machine – if you want proper online processing, you will need to use one of the Payment Service Providers (PSP). These companies submit details securely to the merchant companies. However, they also charge a fee, which could easily be as much as another five per cent.

Those who have opted not to become a merchant themselves could face higher charges still. This is because a number of the bureaux and mall services on the web charge as much as 15 per cent on transactions – or even a flat fee of £2 for any transaction up to £10. Therefore, if your idea of an ecommerce business relies on fairly tight margins, you may well find that you'll need to sell a lot of things to reach the type of rates from credit companies that will fit into your business plan. Otherwise you risk handing over too much money simply to get the cash flowing.

The mechanics

You need more than just the arrangements to take cards to start the ecommerce ball rolling. If you're using a bureau service, there's little more involved than including links to the secure forms that it provides on your website, or simply supplying the bureau with details of the products you want to put in the online catalogue.

If you want to manage everything yourself – and for complete control, not to mention lower fees, it's the most flexible solution – you'll need to do a fair bit of planning. Fortunately, there's plenty of information available to help you. Most of the major software suppliers have worked closely with merchant services and will be able to help you configure their products and even help you fill in the forms to apply for merchant status.

Barclays Merchant Services also has two very useful guides on its website at www.bms.barclays.co.uk, called the Internet Merchant Procedure Guide and the Guide to Accepting Card Payments Over the Internet. Both can be downloaded as pdf files, and are well worth reading for anyone contemplating getting into ecommerce. NatWest Streamline, the other major merchant service in the UK, should have a website online by the time you read this.

Strict security guidelines are laid down by the merchant, and have to be followed if you want to be accepted by them; in fact, they're good practice whether or not you're planning to get involved in ecommerce. We've used the Barclays Merchant Services rules as the basis for our comments here, but others are similar.

The first step in hosting an ecommerce solution is to make sure that your website is

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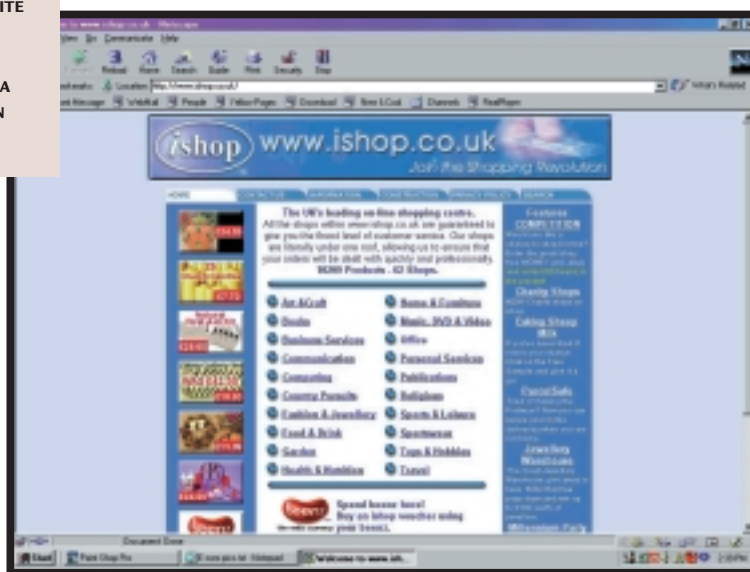
NATWEST OFFERS A MERCHANT SERVICE CALLED STREAMLINE



ECOMMERCE



TO RUN YOUR OWN SECURE SERVER YOU'LL NEED A WEBSITE CERTIFICATE, PROVIDED BY COMPANIES SUCH AS BT TRUSTWISE, BUT IF YOU USE A BUREAU LIKE ISHOP, YOU CAN BYPASS THIS REQUIREMENT



you'll also need software to process the card transactions and link to the payment services. Writing such software yourself isn't easy, if you want to make sure that it's secure, and the card companies will supply a list of programs certified to work with their systems – these will also include many of the security measures you need.

Some of these systems will handle the final link for you; for example, SECPay provides a solution that will interface to your website, but use its servers to pass the connection to a merchant service. That will save you some of the hard technical work – but you'll pay for it in the form of commission charges on top of the basic merchant fees.

There may seem to be a lot of things to consider – and there are certainly plenty of variables to juggle – but once you've grasped the different ways of processing transactions, then getting your ecommerce site up and running really shouldn't be too difficult. You just have to make sure that you choose the right options to begin with. The solutions covered in the rest of this feature should give you some more ideas. Read on,

secure; that means configuring a secure server, for which you'll need a website certificate. While you can obtain a trial certificate free of charge from BT Trustwise, which will at least help you test everything out, if you want a permanent one it'll cost you £259, and then an additional £199 for renewal each year – and if you're relying on an ISP to host your site, expect them to make an extra charge for configuring a secure web server in addition to the normal hosting they provide.

The next stage of security is to ensure that any systems processing card information from your website aren't connected directly to the Internet. That means that you need to keep them firmly behind a firewall, perhaps using a private address range, so that they can't be accessed from outside your organisation.

Finally, there needs to be an additional layer of network partitioning between the system that handles the transactions and the merchant service – although that can simply be via the use of an alternative network protocol, rather than a third computer system.

Nevertheless, you're already looking at two computer systems, and a security certificate. And

then decide what you can afford to do. And wait for the clicks to start coming.

The bureau option

If you don't qualify for merchant status – or you simply don't feel up to the technical aspects of configuring and maintaining a secure site for ecommerce – then the solution is a bureau service that takes some or all of the work from you.

As we've explained before, there are a number of solutions that you can use, some of which you could manage with just the most basic of Internet connections. You can, for example, build a shop online using Ishop (www.ishop.co.uk), just by filling in details such as your VAT registration number and descriptions of the products you have for sale. You can even upload images and include them before publishing your shop within an existing online mall. However, the system didn't really live up to the promise and it was pretty fiddly to construct the store.

A similar idea comes from Mercardo (www.cablenet.co.uk/pages/mercardo), but while it may be attractive to add your products to an existing site which promises additional

ECOMMERCE

ECOMMERCE >>

feature

benefits such as email promotion to registered users, the catch is the commission fees charged – a whopping 15 per cent, and £2 on transactions under £10. If margins are tight, using a bureau service such as this could be an effective way to squeeze them even further!

You don't have to rely entirely on someone else's existing catalogue to use their bureau, however. Some sites, such as NetBanx (www.netbanx.com) and WorldPay (www.worldpay.com), will act as a bureau for you, simply by integrating code for their ordering system into your website.

With this type of solution, you'll pay a setup fee, based on the number of products and the degree of customisation you want, starting at £75 for a single product at a fixed price and going all the way up to £500 for complete customisation.

Once everything is set up, you only have to pay a commission charge of between five and eight per cent on each successful transaction, depending on the amount of business you do each month. Obviously, the commission drops the more business you have on your site – making it important to ensure that you put effort into

promoting your business once you've set everything up.

NetBanx, of course, isn't the only such service – there are others with different payment options and you can often mix and match, using the merchant bureau service provided by a company



MERCARDO ALLOWS YOU TO ADD YOUR SHOP TO AN EXISTING ONLINE SHOPPING MALL

such as NetBanx with the shopping functions of whatever other software you like, including programs such as iCat and Shop@ssistant.

These packages are designed to make it easy to create an online store, without having to build your own shopping cart system, and you can use

Becoming an Internet merchant

Having looked at all the options, how easy is it to actually take the plunge? In the best interests of investigative journalism – and to help out my finances – I decided to become an Internet merchant.

One of the things that I spend time doing is providing information services on the Internet, in the form of mailing lists, web pages, and email accounts for community-based groups and individuals.

I do this on a non-profit basis. But many people have said they're willing to help out, and would contribute to the running costs – a web server, leased line, and so on – if it was easy. In other words, if they didn't have to write a cheque and put it in the post.

So, taking credit cards over the Internet would seem to be the solution to the problem – but would the card companies even entertain an idea such as this? And wouldn't it have to be done through a charity?

According to Tony Surrudge, head of NatWest's Streamline Merchant Services, no. A sole trader can do something like this; the key is ensuring that the business plan is viable, and also that the card companies aren't going to be left with bad debts.

As a first point of call, Streamline's sales office provided a six-page fax with details of payment solution providers and other basic information about accepting cards.

Since cost is a key criteria

– the aim is to generate income, rather than increase overheads, after all SECPay's SEC Card service looked like the best bet, especially since I'm familiar with web programming.

Besides the cost, the main attraction of SEC Card is that the API is very clearly documented on the website, this allowed me to see how I needed to do things before parting with any cash. The service also hosts the secure payment form, meaning that I didn't have to splash out additional money on a website certificate for my own server.

The sequence of events, however, is a little mysterious – a non-refundable £50 ex VAT to SECPay has to be paid up front to start the process,

followed by a call back to Streamline, with no guarantee that an application to either company will be successful – so it's important to make sure you have everything necessary clear beforehand.

But once I had done all this and arranged a business bank account – like many sole traders, I had used a personal account in the past and this isn't sufficient for receiving card payments – the whole process turned out to be relatively painless.

It's difficult, however, to put a final figure on the cost because the time taken creating the necessary web forms and scripts is hard to quantify. Nevertheless, it's been a worthwhile exercise, and cost far less than I had expected.

The ones that got away

A company less thrilled with the prospects of ecommerce is XXX Cards, which specialises in hand-made greetings cards. A two-man operation, at the time of interview it was just gearing up for their first Christmas, selling cards through specialist retailers.

Ecommerce might seem a good way to help increase the profile of the company, but without even an email address, it's starting from scratch. While Internet

access is free of charge, and even a domain name can be had for next to nothing these days, there are still obstacles.

The site itself will be designed by a friend – a web designer seeking work for his freelance portfolio. But the matter of payments is a sticking point.

Even with the low charges involved in a system such as SEC Card, the setup charges, which could potentially total £250, and an ongoing commitment of £10 are, for

this small outfit, too much of a risk. Without promotion, a site may not attract enough visitors for a low-price product such as cards to even cover the ongoing costs.

If additional costs, such as professional web hosting and submission to key search engines, are added, the overall cost in the first year could mount up to several hundred pounds, and that's before a single card has been sold.

Sadly, XXX Cards ended up deciding that, for such a small company, the entry costs for ecommerce were simply too high at the moment. In the short term, however, a 'catalogue' site with a printable order form will at least let people know that the company is out there.

But it appears that, if you rely on small margins and cashflow is tight, then there are still barriers to taking your business online.

many of them regardless of how you ultimately choose to process card payments.

If you choose a system such as Ishop or Mercardo, that aim to provide everything you need, then it's worth looking around the site first. How do the other businesses hosted there look? Would you be tempted to come and visit them? And if you type the name of one of the companies featured, or its key product, into a search engine, will you be directed to its online store? Or will it be languishing at the bottom of everyone's hit lists?

If you just want to take a few steps into the world of ecommerce and are put off by the potential of a merchant sign-up fee of around £200, or simply don't qualify, then a bureau can certainly be a good way to start moving. You can, of course, always change to something else later on, when you've proved that online selling really will work for you.

But beware the charges, especially from catalogue-type sites, where your products may simply not stand out from other items listed.

For a simple ordering system, the type of solution offered by the likes of NetBanx will often be the best bet, allowing you free rein to design your website as you like.

If you do decide to hand all the hard work over to someone else, hosting your pages on a shopping mall, make sure you really are getting value for money. Having to do little more than supply details and pretty pictures of your products may sound appealing, but if the commission is too high you will need to make a lot of sales to see any benefit, which rather defeats the purpose of ecommerce in the first place, doesn't it?

The merchant route

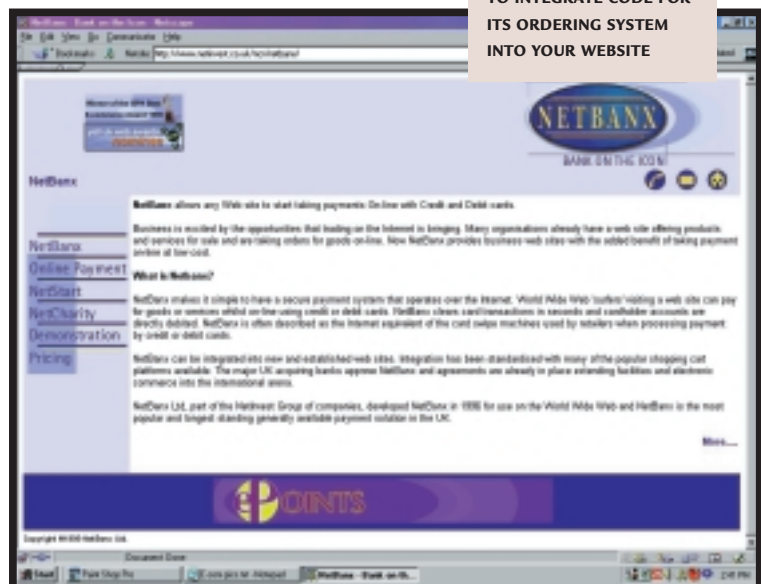
If you want to do more than dip a toe in the water, then signing up with a merchant is the best

way to proceed, and will allow you the maximum flexibility in integrating payments with your website. It's even possible to receive almost instant confirmation of transactions, allowing you, for example, to provide downloadable music, software, or other documents, without running the risk of having someone download your goods only to find that you don't get paid in the end. The major merchant services companies will provide you with lists of firms – PSPs – that are able to help with your ecommerce application, and it's well worth contacting several of them before you decide on a solution.

You'll find, for example, that some have a very clearly published Application Programming Interface (API) that will allow you to write links to your own server-based web applications, while others may prefer you to take their

ECOMMERCE

NETBANX ALLOWS YOU TO INTEGRATE CODE FOR ITS ORDERING SYSTEM INTO YOUR WEBSITE





CREATING AN ECOMMERCE SITE WITH CLICK AND BUILD IS RELATIVELY PAINLESS

software, and build a solution around it.

Features aren't always the same, either – some companies, such as SECPay, have a 'batch' facility, which will allow you to do things such as monthly subscriptions, while others don't. Similarly, some allow a 'micro-payment' option, where small fees, such as a penny to view each web page, can be collected and processed in batches.

And the cost varies tremendously. SECPay (www.secpay.com), for example, charges a £50 setup fee, then a monthly £10, and a commission of 1.9 per cent on each transaction. Remember that the commission has to be added to the fees being charged by the merchant service themselves, so you could be paying almost seven per cent in some cases.

Cable & Wireless charges a rather hefty £1,500 setup, then £50 per month, and a commission of up to five per cent, depending on volumes; but that cost includes ecommerce software as well.

Shopping around – and the willingness to negotiate – pays dividends. But if you want to press the companies on commissions, you'll need a good business plan first. You'll typically need to choose the PSP you want to work with before applying for your merchant status. And as well as the level of fees, that choice may well be dictated by the software that you want to use.

Worldpay (www.worldpay.com), for example, has its own 'Click and Build' system, while Ardeo (www.ardeo.com) has 'Shop in a box.'

Click and Build (www.clickandbuild.com) is a good example of how creating an ecommerce site can be relatively painless; it takes a lot of the work out of designing your site – although you will have to use the templates, which could restrict your design flexibility. You won't even have to worry about hosting with this type of option – it costs £45 per month, including 10MB of web space.

Other PSPs, such as NetBanx – which act as either a PSP or a bureau, depending on your requirements – will work with most of the popular products.

Of those, the UK-written Shop@ssistant at www.floyd.co.uk (reviewed in PCW, August, 1998) is one of the most popular; for £199 it



SECPAY ALLOWS YOU TO TAKE UP MONTHLY SUBSCRIPTIONS

allows you to add JavaScript-based shopping facilities to an existing website with a minimum of effort. By the time you've added merchant services to the bundle, you'll be looking at a total of around £500 to start selling your wares online. And with downloadable modules for web-editing programs such as FrontPage 98 and NetObjects Fusion, it should be easy for anyone to set up shop.

More complex systems, such as InterShop (www.intershop.com) can link to corporate databases, allowing you to check stock levels at the same time as processing an order – but for these you'll need powerful servers, and they're not really suited to a small business. But if you really need this kind of setup and you're unwilling to invest in the technology required, your best bet may be a tie-in with a partner company that will host your entire ecommerce solution for you.

Disable the cable

NO MATTER HOW LIBERATED we are by technology, cabling often holds us back. Nipping downstairs to the living room with your laptop so that you can watch *The Simpsons* while you work is a grand idea until you decide to log onto the Internet – at which point you need to plug in your modem. It would be nice to be able to leave the wires behind and enter the radio realm. Bluetooth is a new technology designed to do just that, and the signs are that it will catch on quickly.

The technology was originally developed as a short-range radio network for personal networking by a group of companies working in the mobile phone and computer markets. These founding members include Ericsson, IBM, Intel, Nokia and Toshiba. They were joined in December by 3Com (which made a success of the Palm Pilot), Lucent, Microsoft and Motorola.

With a communication range of 10m (expandable to 10 times that by using more power in the transmission device) and a theoretical bandwidth of 1Mbit/sec, the technology was originally intended for communication between personal devices such as mobile phones and PDAs, rather than more widespread network communications – although many interested parties are hoping to stretch the technology further.

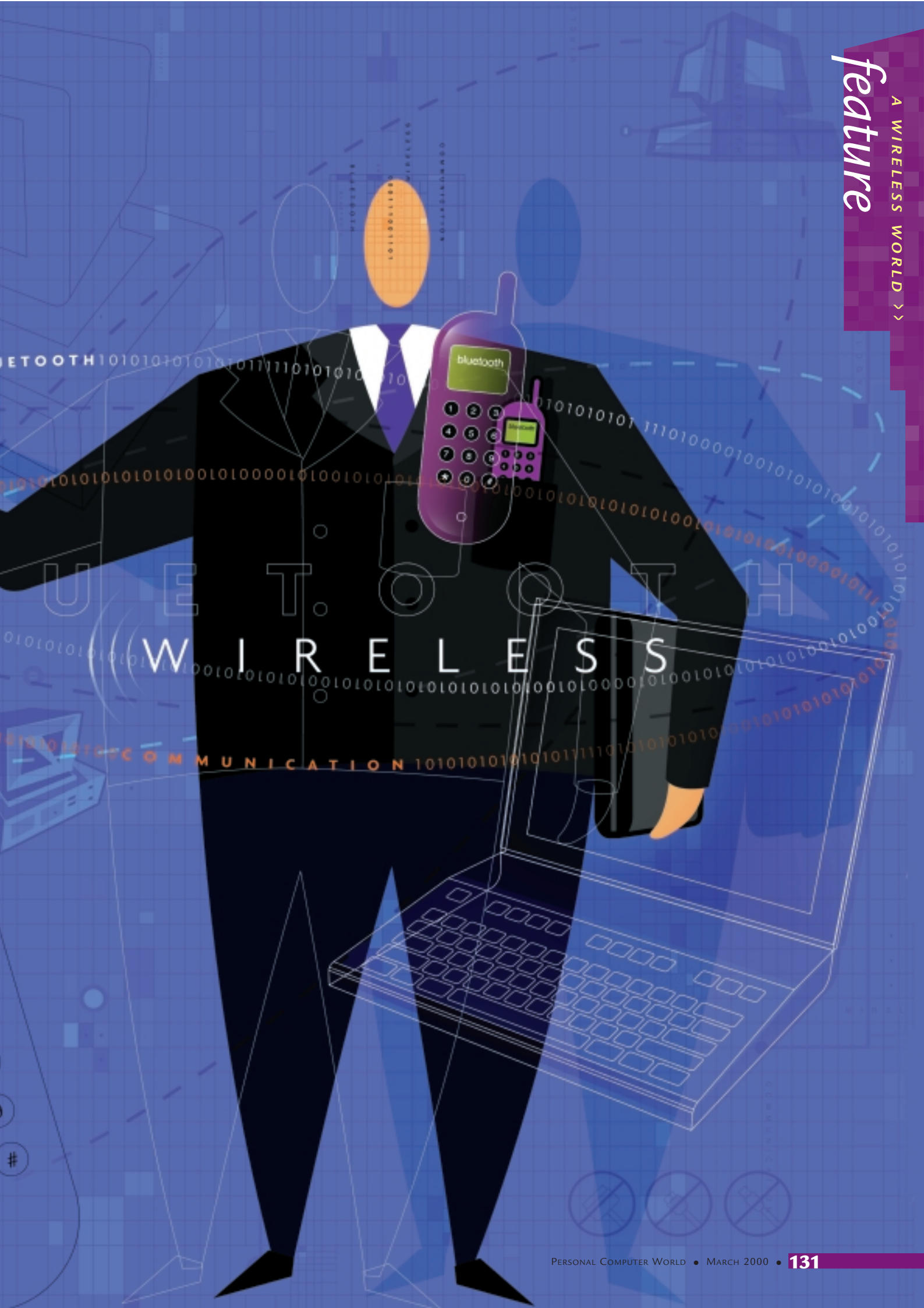
Bluetooth devices transmit and receive in the 2.4GHz radio range and the technology allows up to eight devices to be connected in a network called a Piconet. Devices, that listen on preset frequencies to see if any other devices are around, connect on a peer basis – this means any device can initiate the connection. One device becomes the master, which sets the frequency-hopping behaviour for the Piconet, and the rest become the slaves. Frequency hopping means the devices skip between transmitting and receiving on different frequencies in an agreed manner. This reduces the risk of interference from electrical devices such as noisy vacuum cleaner motors and serves to increase security, making it harder to eavesdrop on the communication between devices. Piconets can also connect to form larger networks called Scatternets.

The companies working on the Bluetooth standard have formed themselves into a group known as the Bluetooth Special Interest Group (or Bluetooth SIG, for short) and they have been working together since May 1998. This organisation also contains a number of sub-groups that focus on different aspects of the technology, such as the radio communication between devices; low-level software; interoperability testing; and marketing. There are also 14 profile working groups that work on Bluetooth applications, such as modems, headsets, mobile phones and Ethernet access.

BLUETOOTH IS
HERE TO TAKE
THE PLUG OUT
OF PLUG AND
PLAY. DANNY
BRADBURY
LOOKS IN
WONDER AT
THE WIRELESS
REVOLUTION
WAITING IN THE
WINGS.



ILLUSTRATION CARLTON HUTCHINSON





Building a service industry

The limited scope of the initial Bluetooth specification has placed the emphasis on low-level hardware connectivity. Although there is support for some data formats such as the virtual calendar and contact manager data-exchange formats, developers who want to connect specific services using the technology may need to do a little work.

Both Sun Microsystems and a Microsoft-inspired consortium have been working on separate data-exchange technologies that could bring even more value to Bluetooth. Sun's Jini and Microsoft's Universal Plug and Play (UPnP) (the latter is

now being developed by a consortium of companies) are designed to let hardware or software services find and use each other over a network.

When a Jini or UPnP-enabled device is attached to a network on which other compatible devices are already established, it is instantly able to take advantage of any of the other devices' services, regardless of operating system or processing platform. When used in conjunction with a wireless network such as Bluetooth, the possibilities become very exciting.

Imagine, for example, walking into an office with your Bluetooth-enabled and

Jini-aware PDA. Your PDA would check the network for other devices, and find a network-enabled colour printer, a scanner, an independent storage device, a PC running a contact database, and a colour projector that were all Jini-compatible. The two technologies working together would let you use any of the other services. You could scan photographs on the scanner straight into software on your PDA, fold them into an existing presentation on your device, print copies of it to the network printer and then use the projector to display it – all without plugging anything in

or trying to establish any manual network connections.

That's the idea, anyway. The first big wave of Jini-based devices is still months away, and UPnP technology is still being developed. A third technology, called Salutation, is already out there, but has received less attention. These technologies still have to be integrated with Bluetooth, and discussions between the various parties are embryonic. However, the furthest advanced in terms of Bluetooth integration appears to be Salutation.

www.jini.org
www.upnp.org
www.salutation.org

Bluetooth will start out as an option in mobile phones, but it is planned to later make it a mandatory addition to new handsets. As the technology takes off, it will also appear in devices such as PDAs, headsets and digital cameras.

One of the biggest factors influencing the speed of Bluetooth adoption will be the price, according to Mike Reynolds, senior consultant at technology think-tank Scientific Generics. He explains that companies pushing the Bluetooth standard are targeting any device which uses a type of microchip called an application-specific integrated circuit (ASIC). These are designed to do a single task very quickly, such as compress images in a digital camera. The manufacturers argue that integrating Bluetooth into these types of devices will only add around £3 to their price.

But Richard Bisset, product marketing director at semiconductor design company Atmel, a company that is designing Bluetooth-compatible chips, isn't convinced. He argues that £3 is the sweet spot many manufacturers like to predict for Bluetooth, as it is the price point at which the technology will become ubiquitous, but the industry is a long way from hitting this critical point. Bisset believes that real figures at present are hovering around £9, although the exact cost will depend on the nature of the device and the volume of production. Atmel's price range for up to one million Bluetooth chips hovers between £8-£11 per unit – a significant premium to pay on sub-£65 devices.

As with any new technology, the take-up of Bluetooth will be driven by the applications it can be used for, and Reynolds believes that the

development of Bluetooth applications will be divided into three generations. The first phase will cover the areas originally intended by the Bluetooth SIG – telephones and possibly PDAs. Being able to use a mobile telephone with a headset separate to the base unit would create truly hands-free mobile phones. Also, connecting to the Internet via a mobile phone from a PDA without using wires will definitely appeal to PDA users fed up with attaching cables between devices just to pick up email.

Ericsson, one of the founding members of the Bluetooth SIG, has already made moves in these areas. At US trade show Comdex Fall, held last November, it announced a Bluetooth headset, which will be available to consumers in June this year. It's a light device that connects to a cellular phone through an adaptor. A little later in the year, the first Ericsson phones will ship with built-in Bluetooth compatibility.

The second generation of tools, says Reynolds, will do away with cabling for attaching devices to desktop and laptop PCs. Reynolds argues that solving customers' cabling problems is a major technical support overhead for PC vendors. 'If they can get everything talking over radiowaves, then their margins will go up because their support costs will go down,' he said.

It would also make computing a lot neater. Not having to hook your printer, scanner, modem, keyboard, speakers or mouse to your computer via cables would help to get rid of the spaghetti at the back of your desk, and enable you to rearrange your desk without getting down

Other technologies for a wire-free world

Bluetooth is far from the only close-range wireless communication technology on the market. Here are some of the others:

IrDA

Infra-red technology provides line-of-sight connectivity to systems up to one metre apart (the IrDA website says two metres can be reached). The data-transmission speeds range from 9600Kbits/sec to 4Mbits/sec depending on cost.

IrDA Data, released in 1994, focuses on two-way data transmission between, say, a mobile phone and a PC, while IrDA Control focuses on control-oriented devices such as joysticks.

Disadvantages to IrDA are that it needs two devices to be pointing at each other to work, making it less intuitive. Scientific Generics' Mike Reynolds argues there have been few formal processes to guarantee that different IrDA devices will be 100 per cent interoperable, which he says has hindered its take-up.

www.irda.org

OpenAir

Developed by wireless LAN vendor Proxim, this proprietary technology operates in the 2.4GHz band, and offers 15 separate 1.6Mbits/sec channels for the use of separate networks in the same space.

www.proxim.com

802.11 and 802.11B

802.11 was developed by the IEEE standards body, and approved back in 1997. It operates at 2Mbits/sec. The newer version, 802.11B, offers a higher throughput. Apple uses it for its Airport wireless LAN technology, which provides a hefty 11Mbits/sec bandwidth.

www.ieee.org

HomeRF

The HomeRF technology has a 50m range and uses a radio beacon for connectivity. Frequency hopping at 50 hops per second, it operates in the 2.4GHz band and can run at up to 2Mbits/sec. Derived from the DECT cordless telephone standard,

it supports up to six voice conversations, and a Shared Wireless Access Protocol (SWAP) Home RF network can support 127 devices.

www.homerf.org

HiperLAN

HiperLAN Type 1 was ratified in 1996. It works in the 5GHz range, providing up to 23Mbits/sec data throughput and has a 10-17m range in most indoor environments.

A wireless version called HiperLAN 2 for radio ATM is under development, as is a wireless local loop protocol called HiperAccess and a wireless point-to-point version called HiperLink.

www.hiperlan.com

on your hands and knees to unravel a bird's nest of cables. Also, imagine being able to download images from a digital camera just by having it in the same room as your PC!

In its third generation, possible applications are more outlandish. Reynolds argues that once the pricing for Bluetooth chips reaches the right level, the technology could find its way into anything that could benefit from communicating. Examples could be washing machines that notify engineers to get a part in stock. 'There are already large items of equipment such as cranes which have mobile phones built in that already do that,' he said. Your washing machine could send an email via your PC, or digital television.

Other examples of Bluetooth applications include smart cards that hold your personal data and exchange them with Bluetooth-enabled units as you walk past. Such systems could be used to digitise passport and air ticket information so your passage through an airport would be much quicker. There has been talk about virtual money as well - Bluetooth-enabled credit cards or electronic cash cards that communicate with compatible point-of-sale terminals.

Synchronising your PDA calendar with your desktop personal information manager would be much easier without all those cables, while Bluetooth-enabled MP3 players would be a dream. How about grabbing your Palm Pilot or Psion, finding a contact and having the PDA tell your telephone to dial the number for you? If you had a Bluetooth-enabled headset, you could even

leave your phone in your pocket or bag and make the call without even looking at it.

This last suggestion highlights the voice facilities within Bluetooth. Besides eliminating cables, this is the area that holds most interest for many Bluetooth vendors because it is what the technology was originally designed to do.

Andres Edlund, who deals with the marketing of Bluetooth technology for Ericsson, explains that Bluetooth can support from one to three simultaneous voice calls with various grades of protection against interference. Also, if a voice call is being used in a Bluetooth Piconet while data is also being transmitted, he says, Bluetooth can gracefully decay the quality of a voice call to make room for the extra volume of data.

Nevertheless, there are limitations. Bluetooth's theoretical maximum bandwidth is 1Mbit/sec and the communications overhead leaves you a real asymmetric bandwidth of just 721Kbits/sec with a 57.6Kbits/sec return route. This drops to 432.6Kbits/sec in a symmetric link. This is slow compared to even basic Ethernet technology, highlighting the fact that it wasn't originally designed for heavyweight LAN applications, but for personal networks. However, the SIG is discussing higher-bandwidth implementations for Bluetooth 2.0, and rumours suggest a possible 2Mbits/sec implementation.

For Bluetooth to become universal the price needs to come in at an affordable level. This is the perennial problem for new technologies, but the heavyweight industry support for Bluetooth makes it likely to succeed.



SOUND AND VISION HAVE BEEN SORTED OUT, BUT HAVE YOU EVER FELT YOUR DATA?

The gentle touch



AS FAR AS COMMUNICATING with computers goes, sight and sound have been figured out. But have you ever wondered what it would be like if instead of just visualising your data you could touch it too?

Touchy-feely interfaces, or 'haptic systems', have been around for some time. Games enthusiasts blast away using devices such as the Microsoft SideWinder joystick, or the more recent Logitech WingMan force-feedback mouse, but as a general-purpose method for human-computer interaction, touch has been little explored. Recent advances in the technology mean a whole range of haptic applications are on the horizon – from virtual surgery training to 3D sculpting.

A system called ReachIn (www.reachin.se) offers convincing evidence that the haptic interface is going to become very big news. ReachIn provides stereoscopic imagery and force-feedback using a customised PC configuration. The monitor is angled at 45

degrees down towards the desktop. In place of the keyboard is a mirror that reflects the monitor screen. Underneath the mirror is a force-feedback stylus that the user holds.

The stereo graphics are achieved using the CrystalEyes system (www.stereographics.com), which works on the principle that because our eyes are a few centimetres apart, when we view a real 3D scene each eye sees the image from a slightly different perspective. The brain then knits the two views together. Using CrystalEyes, the monitor switches rapidly between two displays of the scene: one as if viewed by the left eye only, the other as the right eye would see it.

Looking at the monitor with the naked eye, all you see is a shimmering blurry image. But when you put on the cordless CrystalEyes glasses you see a true 3D image floating in space. It works because each lens in the glasses is a liquid crystal shutter that can be electrically flipped from transparent to opaque. A small box on top of the monitor sends an infra-red signal to the glasses to tell them which image is currently on display. If it's a left-eye image, the left lens opens, and the right one shuts. And vice versa, at least 30 times a second. It might sound unlikely that this works, but it does, and the image quality is superb.

Below the mirror the user holds the stylus of a Phantom force-feedback device (www.sensable.com). The stylus, about the size of a ballpoint pen and attached to the body of the device by a lightweight linkage, can be moved around freely by the user. The device can also press the stylus back against the user, with three tiny motors under software control.

It's hard to describe how it feels to use the system, but the effect is stunning. At a recent demo I was not the first person in the room to shout 'wow!' as I dragged the stylus across an object floating in space in front of my eyes, able to feel the bumps on the surface. It was weird, to say the least, as you're seeing and touching an object you know does not really exist. Then I tried making an injection into a vein in a virtual hand, and the feeling of resistance as I pushed the 'needle' through the 'skin' was very creepy.

The haptic interface is compelling. As for the full virtual experience, it can only be a matter of time before we find ways for computers to stimulate our other senses too.

TOBY HOWARD

RESEARCHERS ARE HOPING SELF-LEARNING SOFTWARE WILL SPEAK ALL LANGUAGES.

Tongue twisting

THERE'S NOTHING LIKE a good biblical story to inspire a new IT product. Remember the Tower of Babel, which was to be built so high that it would reach God? God stopped it from being constructed by causing all the builders to speak in different tongues, meaning that no-one could get any work done. It's good to talk, but only if you're speaking the same language.

Douglas Adams used the idea of a Babel Fish in his *Hitchhiker* books as a way to get around the fact that his characters spoke different languages. Characters became multi-lingual by inserting a small fish in their ears. The fish would interpret other languages and relay it to the characters in their mother tongue.

Multilingual marine life notwithstanding, the idea of instant translation is attractive, as

people communicate more over such mediums as the Internet. Services that allow quick and accurate translations would break down barriers between different cultures and make interaction easier, both in business terms and from a consumer perspective.



Unfortunately, translation is one of those areas that is proving to be too complex for even the power of the latest PCs. The problem is that there are just too many language variables for computers to deal with. Think of the word 'part'. It has many different meanings: to part you hair, to pick up a car part, or even phrases such as 'part and parcel'.

Differences in language and idiom make it difficult for machine translations to work well. Typically, a translation will need to be edited for accuracy and grammar if it is to be shown to someone in a business context, for example.

Nevertheless, a group of researchers at the University of Southern California Information Sciences Institute (USCISI) is looking at a way to create more accurate translations under a project known as Gazelle (www.isi.edu/natural_language/projects/GAZELLE.html). The group, funded by the US Department of Defense, is developing software to translate 'difficult' languages such as Japanese and Arabic into English, but it believes the research will also

make it easier to develop translation technology for other languages.

The researchers hope to make the Artificial Intelligence used in machine translation more accurate by creating software that will self-learn linguistic knowledge by analysing large online text collections to derive translation rules.

This is not the first time a research group has looked at this method. Researchers at Sheffield University have also been developing automated programs that comb through text in order to develop translation rules.

But the group at USC is also working on ways to translate real-world natural language sentences that are long and complex, and often contain unexpected grammatical constructions.

It has developed what it calls a Controlled Skip Parser which can decipher real-world sentences by, ironically, skipping some of the words in the sentence. The software is intelligent enough to control its behaviour to find out which words to skip. Statistical information, which is learnt from past successful experiences, is used to control the skip.

While these advances are likely to improve machine translation services such as those available on the Internet from Altavista and Freetranslation.com, they are unlikely to lead us to the holy grail of a computerised Babel Fish.

Even speaking into a trained voice recognition system designed to listen to continuous speech can leave you with a high number of errors. You would not want to write a document using speech recognition software without checking it through first. Similarly, you would not want to say something to an important business contact, family member or even friend if you were unsure that it would keep its meaning, so introducing another possible layer of error into the equation could produce embarrassing results.

Although you could produce makeshift Babel Fish software by speaking text into a word processor and having a translation package convert it, we are unlikely to see cheap devices enabling you to do it fluently in a noisy cafe.

It looks like the phrase book is here to stay, proving that at times, the silicon chip just can't replace good old paper and ink. In the meantime, remember what a thousand British sitcoms have taught you – that speaking loudly won't make non-English speakers understand you better...

DANNY BRADBURY

Turbo PCs

AMD and Intel are vying for the top spot in the high-end PC arena and home power users are weighing up the options. We put 11 top-of-the-range machines through their paces.

Our group test this month has a slightly unusual flavour. Flick through the next few pages and you'll see that some manufacturers have submitted more than one PC. This is because, with AMD's renewed vigour as a contender for the crown of fastest CPU manufacturer, more and more people looking to splash out on a high-end PC are wondering just which route they should go down to achieve the best performance as well as the best value – Intel or AMD.

We thought it best not to tie manufacturers' hands by setting a price point for this month's test, instead giving them other criteria. We decided to target home power users. So as well as browsing the web and using standard office apps, they'd also want to play graphically demanding games and perhaps do some home video editing with their machines. So we asked for high-end machines, featuring the fastest Intel or AMD processors the vendors

could supply. To enable video editing and serious 3D gaming out of the box, a graphics card with at least 16MB of RAM, plus video capture capabilities was required. If no video capture was available on their card of choice, a dedicated capture card had to be present instead. To be consistent with high-end CPUs and graphics we also stipulated that the machines should sport at least 128MB of RAM, a minimum of 22GB of hard disk storage, a backup drive – we left it to the vendors to decide what sort – and at least a 17in monitor. Finally, we allowed them to submit two machines if they wished, one with an Intel and one with an AMD processor.

The result was an interesting mix of powerful machines, although one processor manufacturer was the clear favourite among the manufacturers – read on to see which one.



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• PCs reviewed and tested by David Fearon.

Ratings

- ★★★★★ EXCELLENT
- ★★★★☆ VERY GOOD
- ★★★☆☆ AVERAGE
- ★★☆☆☆ BELOW AVERAGE
- ★☆☆☆☆ POOR

Big Red Phantom K7/700

Big Red has been around for a while, but it's only recently that its machines have been red by name and red by nature. But the translucent cherry case isn't just a pretty face – it's also easy to get into via the side access panel, which simply unclips without requiring a screwdriver.

Inside the Phantom lurks a 700MHz Athlon processor, which is not the fastest chip in this test in terms of clock speed. Big Red has supplied some worthwhile peripherals though, such as the Teac PowerMax 1000 speakers. When playing a DVD through the SB Live! Player 1024's digital output these give you a true Dolby Digital AC3 setup, including centre speaker for dialogue.

Graphics and video capability haven't been skimmed, with 3dfx's Voodoo3 3500TV graphics card. The card can capture its TV signal or an external video input and encode it into MPEG2 format in real time. It includes a VCR-like recording applet and competent video-editing application.

Keyboard and mouse are the chic Logitech cordless variety. They work

perfectly, and lefties will appreciate the symmetrical mouse. A Mitsubishi Diamond Pro 900u monitor, with its 19in Diamondtron NF aperture-grille screen, gives a vibrant picture.

The processor sits in a Gigabyte GA-71X motherboard. One of three DIMM holds 128MB of memory. There are two PCI, one ISA and one shared slot free. A 27GB IBM Deskstar hard disk occupies one 3.5in internal drive bay, leaving one free. As with all but one of our entrants, the Phantom's backup device is a CD-RW drive, a JVC unit, leaving one 5.25in bay free.

Among its higher-clocked rivals, the Phantom ranked fairly low in the speed stakes, coming second to last in the SYSmark table and just under halfway in the 3DMark tests. It is well put together, but there's better value elsewhere.



PCW DETAILS

Price £2,349 (£1,999 ex VAT)

Contact Big Red 08700 711 117

www.bigred.co.uk

Good points Pretty looks, good supporting components

Bad points Relatively slow, not the best value for money

Conclusion A good PC by any measure, but not the best

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Carrera Octan M750

The Octan M750 features a 750MHz Athlon processor, the fastest standard version currently available. Backing this up is a single 128MB SDRAM DIMM, and a whopping 34.2GB IBM Deskstar 34GXP hard drive, with 7,200rpm spindle speed and a 2MB on-board data buffer. An LG CD-RW drive provides backup, while Panasonic takes care of DVDs.

If you're looking for a video-editing solution, look elsewhere: the Octan has no video capture ability. What it does have is Guillemot's 3D Prophet graphics card featuring nVidia's GeForce 256 chipset. Other manufacturers have supplied GeForce cards, but only Carrera managed to include the new variant with DDR (double data-rate) RAM. There's also a digital flat panel output, although the PC we saw was equipped with an LG

Studioworks 910SC monitor. This 19in shadow mask unit doesn't stand up to the sharper, more vibrant flat screen, aperture-grilled units from some other manufacturers, but it costs less.

Internal construction is neat, with IDE cables flat-routed and power cables bundled and tied, with spare power connectors brought out to the free drive bays – there are two front-panel 5.25in bays and one 3.5in. Occupying two of the four PCI slots are a SoundBlaster Live! Value and a generic 56K modem. The SoundBlaster drives a set of Altec Lansing ACS54 speakers, with four satellites and a sub-woofer. Those looking to fill the drive bays and free

expansion slots will appreciate an extra cooling fan at the bottom front of the case.

SYSmark performance was extremely good,

with its score of 292 just a few per cent away from the top of the league. 3DMarks were disappointing, but since 3DMark99 Max doesn't support the GeForce's hardware transform and lighting capability, this is slightly misleading.

PCW DETAILS

Price £2,100 (£1,787 ex VAT)

Contact Carrera Technology 020 8307 2800

www.carrera.co.uk

Good points GeForce DDR graphics, 750MHz processor, capacious hard drive

Bad points Rather average monitor, no video capture capability

Conclusion This relatively stripped-down machine gives high performance for a low price. A good base for expansion, although we'd prefer a better monitor

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Evesham Vale Athlon 750



This is an expensive machine, but you get a lot more than just a fast processor. Like Big Red's system, the most obvious peripheral is the huge speaker system, VideoLogic's DigiTheatre, with four satellites, sub and centre dialogue speaker for proper Dolby Digital reproduction. Unfortunately you'll have to shell out extra for a digital I/O daughter card to expand the SoundBlaster Live! Value if you want Dolby Digital.

The Guillemot 3D Prophet graphics card is one of the fastest around, but doesn't have a

video input. To compensate, Evesham has included Miro's superb Studio DC10 Plus capture card which captures MJPEG video and includes an excellent editing application. The 3D Prophet drives a 19in Taxan ErgoVision 980 monitor that gives a very sharp picture via its Diamondtron NF flat screen tube, plus side-mounted USB ports. It's not quite as sharp as Mitsubishi's 900u. Backup is in the form of an LG 8024B CD-RW drive.

Internal build is good, with all cables tidied with spiral-wrap, although this does slightly obscure the two free DIMM sockets – the third is occupied by a 128MB SDRAM DIMM. This is the only system with a Maxtor hard disk: a

DiamondMax Plus 6800 27.3GB model, boasting 7,200rpm spindle speed and a 2MB data buffer, sits in one of the four 3.5in bays. Software is Lotus SmartSuite Millennium.

Evesham has certainly hit

on a good blend of components, since the PC romps home with fastest scores in both SYSmark and 3DMark. The quality components don't come cheap, but if it's a great all-round high-end performer you're after, this is a good bet.

PCW DETAILS

Price £2,466 (£2,099 ex VAT)

Contact Evesham Micros
0800 0380800 www.evesham.com

Good points Exceedingly fast, great components

Bad points SB Live! Value can't take full advantage of speakers' AC3 input; expensive

Conclusion A super-fast system, perfect for games or more serious processor and graphics-intensive work. Other systems are cheaper but the Evesham still represents good value

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★



Processor technology in development

Computing technology never stands still for long. The 750MHz Athlon and 733MHz Pentium III may be the newest processors on the market, but their respective makers are already designing the next generations of CPUs. In the case of Intel's newest baby, the Itanium (formerly codenamed Merced), prototypes are already with developers and system integrators.

Itanium is the first processor designed around Intel's IA-64 architecture. It's not, however, the first 64bit processor – Sun's UltraSparc and DEC's (now Compaq's) Alpha are both 64bit. But IA-64 also encompasses other design developments, notably EPIC (explicitly parallel instruction computing), in which code is

heavily optimised at compile time to allow enhanced parallel execution. The first Itaniums will ship in mid-2000, but they'll be high-end CPUs destined for servers. The technology will no doubt filter down to the mainstream eventually, just as the Pentium Pro's P6 core in the Pentium II.

AMD is following suit with a rival technology. Whereas IA-64 abandons the x86 instruction set, AMD's Sledgehammer CPU will extend it. Its x86-64 instruction set allows for greater compatibility and allegedly faster execution of IA-32 applications. But this could lead to compromises in 64bit operation compared to Intel's clean-break technology – AMD's press release calls x86 'inelegant'.

Causing a minor stir

earlier this year was the E2K design from Russian company Elbrus. Fully x86-compatible, and fabricated using a 0.18micron process, it's intended to run at 1.2GHz and the company claims that it will outperform Itanium. The stumbling block, however, is that Itanium is already a reality but the E2K exists only in simulations. The development team has had experience with design and realisation of high-performance processors for the Russian military in the past, so the E2K is being taken at least semi-seriously, but it's unlikely to cause Intel too many sleepless nights.

Elbrus is currently looking for a company to stump up the required £37.5m for development of the design that it claims

could be delivered in three years. See www.elbrus.ru.

Another dark horse is Transmeta's Crusoe processor. There's currently precious little information, but all is due to be revealed to the world on 19 January. One of the patents filed by the company details a processor allegedly able to run x86 applications in emulation mode, faster than a native x86-based processor. See the company's website at www.transmeta.com for a tantalising secret message.

Despite all the groundbreaking technology in development, however, for the time being advances at consumer level will be characterised by incremental improvements in clock speeds, cache speeds and fabbing processes.

Mesh Matrix 750 Pro

The fourth Athlon-based PC in this test comes from Mesh, although it also sent an Intel-based machine (see below). The Matrix 750 sports a 750MHz Athlon, plus 128MB of RAM in a single SDRAM DIMM. In this company the IBM Deskstar 22GXP hard disk, while fast, looks a little on the small side with its 22GB capacity.

Graphics are handled by a Matrox Millennium G400 with DualHead output – a good card, but it has no video capture facility and there's no standalone card to compensate. Output from the Millennium goes to a Taxan ErgoVision 980, with an excellent Diamondtron NF flat screen.

The Asus K7-M motherboard has an AMR (audio modem riser) slot, made redundant by the presence of a SoundBlaster Live! Player 1024 and PCI 56K modem, but Mesh has thoughtfully made use of the AMR slot's spare blanking plate by fitting two extra USB ports, for a total of four, plus there are another four on the monitor. The SoundBlaster feeds a set of Labtec

LCS-2514 speakers that are good but not in the same league as those supplied with the Evesham or Big Red machines.

Internal layout is extremely neat, with the two free PCI and one shared slot, plus Slot A and two free DIMM sockets all easy to access. The only potential pitfall is the rather thick audio cable from the SoundBlaster that could make installing a card in the adjacent slot a little tricky. Hardly a major flaw though.

On the software front, Corel WordPerfect Office provides all the office applications you'll need. In the speed stakes, the Matrix 750 gives a reasonable account of itself, although the Millennium G400 is not the fastest card around these days, so the 3DMark score is a little low.

Despite this, the Matrix 750 has the best overall price-performance ratio, making it one to consider if



you're not bothered about the lack of video capture.

PCW DETAILS

Price £2,114 (£1,799 ex VAT)

Contact 020 8208 4706

www.meshplc.co.uk

Good points Fast, good value, well built, high-quality monitor

Bad points No video capture, relatively small hard disk

Conclusion A fine machine for those not into video editing

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★

Mesh Pegasus 733

The first machine based on an Intel processor, and the second entrant from Mesh, the Pegasus 733 sports a 733MHz Pentium III CPU. This is the newest and fastest Intel processor currently available, with 256KB of full-speed Level 2 cache on die.

Most of the components are identical to those of its cousin the Matrix 750. At the core is 128MB of SDRAM, an IBM Deskstar 22GB hard drive and Matrox Millennium G400 DualHead graphics card. There's also a Pioneer DVD-ROM drive and Philips CD-RW, standing out by virtue of its gold disc tray.

One difference is the monitor, a Taxan Ergovision 755, one of only two 17in units this month. It provides a great picture at 1,024 x 768, but at 1,280 x 1,024 with a 75Hz refresh rate it was hard to correct

geometry distortions, and things are too small at this resolution, whereas most 19in units handle it fairly easily.

Being a Slot 1 processor, the Pegasus also has a different motherboard to the Matrix 750 – a Tyan S1854. This has both Slot 1 and Socket 370 CPU connectors, but isn't a dual-processor board. There are no dedicated ISA slots, but there is one shared slot and five dedicated PCI, three of which are free.

Ancillary components and software are identical to the Matrix 750.

It's very interesting to note that the Pegasus 733 manages to outstrip the

Matrix 750 in both SYSmark and 3DMark tests, showing that Intel certainly isn't out of the running yet, although we suspect that this is down to the initial problem with supporting AMD chipsets rather than the CPUs themselves.

PCW DETAILS

Price £1,761 (£1,499 ex VAT)

Contact Mesh 020 8208 4706

www.meshplc.co.uk

Good points Faster than its AMD-based counterpart, and cheaper too...

Bad points ...but the monitor is lower quality, and there's no video capture facility

Conclusion The fact that the Pegasus is the cheapest machine here, and one of the fastest, shows that AMD isn't having things all its own way

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★



Panrix Magnum 750



The Magnum 750 is the first machine this month to sport a significant hardware addition – a Promise FastTrak 66 RAID controller. Attached to the controller and configured as a RAID 0 striped set are two 28.5GB Seagate Barracuda hard drives. This gives a total storage capacity of 57GB, plus extremely fast data throughput. Aside from the RAID array, the Magnum is the only PC with 256MB of RAM made up by two 128MB DIMMs fitted to its MicroStar 6167 motherboard.

A CD-RW drive from AOpen hides behind the front fold-back flap of the stylish case. The latter gives easy access to internals via its slide-off side panel.

Graphics are handled by a Guillemot 3D Prophet GeForce 256-based card, while video capture is dealt with by a Hauppauge WinTV card with remote control – not such a good solution as a Miro DC10 Plus, but still worthwhile. For video editing an MGI VideoWave is supplied in a software bundle that includes Lotus SmartSuite Millennium.

The 3D Prophet drives a Mitsubishi Diamond Pro 900u 19in monitor that gives superb picture quality, and a USB hub. Running at a resolution of 1,280 x 1,024 is easy with this display.

In the SYSmark benchmarks, the Magnum comes joint fourth alongside the Mesh Matrix 750, and the 3DMark score was second only to Evesham. These benchmarks don't really stress the potential of the RAID array, however, and this PC



is likely to be more suitable than either of those for capturing high-res video.

The downside of the RAID array is, of course, the effect on the Magnum's price. It's the most expensive machine here, but for the money you get a very capable system.

PCW DETAILS

Price £2,814 (£2,395 ex VAT)

Contact Panrix 01132 444958

www.panrix.com

Good points Loads of RAM, RAID array, 750MHz processor, great monitor

Bad points Expensive, could do with a better capture card

Conclusion If you really need RAID plus the absolute fastest processor, the Magnum is your machine. But if you just want RAID, consider the Polar machines too

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Polar Professional Athlon 700

The trend toward the wonders of RAID continues with Polar's PC that, like the Panrix, has two hard drives connected to a Promise RAID controller and configured as a striped set. The two IBM Deskstar 25GP drives give a capacity of 50GB. These spin at 5,400rpm compared to the 7,200rpm of the Seagate Barracudas in the Panrix, although they have four times the cache at 2MB apiece.

The 700MHz Athlon processor is accompanied by a single 128MB DIMM, leaving two sockets free on the Gigabyte motherboard. The board also has four PCI, one shared and one ISA slot. All four of the PCI slots are occupied by the RAID controller, Ensoniq AudioPCI sound card, Conexant PCI modem and 10Base2/10BaseT network card.

The Polar's graphics are handled by an Asus V3800 Ultra Deluxe, which is

based on nVidia's TNT2 Ultra chipset. The card also has a TV tuner and video capture facilities, and a pair of 3D LCD glasses are included that serve to give you a headache as well as producing a rather dodgy stereoscopic effect with Direct3D and OpenGL applications. The capture software included with the card, Asus Live, performs capture only – there are no editing facilities and no standalone video-editing application. No office suite is supplied either. The V3800 does, however, drive a lovely Mitsubishi Diamond Pro 900u monitor. Logitech's swish cordless keyboard and mouse provide for input, both working perfectly via radio link.



With its 700MHz processor, the Polar was never destined to win the benchmark shoot-out, but it comes at the top of the 700MHz systems in SYSmark, beating a 733 PIII in the process, and gives a respectable 5,192 in 3DMark.

PCW DETAILS

Price £2,349 (£1,999 ex VAT)

Contact Polar Technology

0800 138 1238

www.polartechnology.co.uk

Good points RAID controller for less than Panrix, network adaptor, monitor

Bad points Average sound card, relatively slow processor, good but not absolutely cutting-edge graphics, no software to speak of

Conclusion A good machine, but it doesn't really sparkle

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Polar Professional PIII 700

The second of Polar's entrants this month also has a 700MHz processor, this time a Pentium III. It's the only system with an all-Intel CPU subsystem, with an Intel CC820 motherboard, populated by the Intel 820 chipset. The CC820 supports most of the 820 chipset's features, including 133MHz FSB (front side bus) and AGP 4x. Unfortunately, neither the CPU nor the graphics card can take advantage of them, but the potential is there.

The CC820 doesn't support 133MHz SDRAM, or the much faster RDRAM, so the Professional PIII 700 is fitted with a single 128MB standard PC100 DIMM. There's only one spare DIMM socket available for future upgrades, unlike the majority of boards in the other systems. The CC820 also has that slightly odd AMR (audio modem riser) slot that, not surprisingly, is left unused, with a PCI Diamond Supra modem and Ensoniq AudioPCI sound card present instead.

This PC is identical to Polar's Athlon 700, including the 50GB RAID array and

the Asus V3800 Ultra Deluxe attached to a Mitsubishi Diamond Pro 900u monitor. Other peripherals include Pioneer DVD-ROM, Wearnes CD-RW drive and a PCI network card complete with BNC T-piece for instant connection to a thin Ethernet network. There's just one PCI slot free and no dedicated ISA or shared slots.

One thing both Polar machines lacked was a setup guide or system manual. This is hardly likely to be a problem for the target market, but you may want to bear it in mind.

The PIII 700 with its standard 100MHz system bus can't stand up against equivalently-clocked Athlons with their two-cycles-per-clock bus, and consequently this machine's performance is significantly slower than the Athlon 700. And considering that it's exactly the same price, we can't recommend it.



PCW DETAILS

Price £2,349 (£1,999 ex VAT)

Contact Polar Technology
0800 138 1238

www.polartechnology.co.uk

Good points RAID controller, network adaptor, monitor

Bad points The slowest machine in the application benchmarks, plus all the bad points of Polar's Athlon system

Conclusion AMD is a better choice for a 700MHz system

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

What is RAID?

Some of the PCs we've looked at this month have a novel feature: they have two hard disks in a RAID array. RAID stands for Redundant Array of Independent (or inexpensive) Disks, and can achieve three different effects – increased data security, increased hard disk performance, or a mixture of both.

To implement a RAID array, specific hardware is required – you can't simply attach two hard drives to a standard system, at least not if the system is running Windows 95/98 or NT Workstation. Traditionally the preserve of heavily-loaded servers, Promise's FastTrak 66 card is the first widely-available RAID controller for EIDE drives.

The two most common

RAID types are striping (known as Level 0) and mirroring (known as Level 1).

Striping

Striping, the configuration sported by machines in this group test, increases disk throughput by dividing read and write operations between the available drives. If there are two drives in a Level 0 array, then when a write operation occurs, 50 per cent of the data goes to one drive, and 50 per cent goes to the other. The two write operations happen simultaneously, so the whole thing takes only half as long as the equivalent operation would take using a single drive. The same thing happens in reverse during a read operation.

Not only is a dual-drive RAID array up to twice as fast as a single drive, the full capacity of both drives is available, so two 25GB drives in a Level 0 array are presented by the controller card as a single 50GB volume to the host system.

Mirroring

The second common type of RAID array, mirroring, simply involves sending all data to both drives. This means that the array as a whole has the same capacity as the smallest drive, and the performance of the slowest drive, so it makes sense to use identical drives. In the event of one drive failing, however, the hardware will seamlessly switch to exclusive use of the other with no data loss. It's worth noting that the Promise card

also supports striping plus mirroring with four drives: here each pair of drives forms a two-drive Level 0 array, with one pair mirroring the other, and in the event of one drive failing the remaining good pair continues to operate as a Level 0 array.

A third RAID level, striping with parity (Level 5), is supported by more expensive controllers and also by Windows NT Server in software. This requires three or more drives. Data is striped as with a Level 0 array, but additional error correction data is also included. This gives increased performance, plus if one drive fails the system can reconstruct the data from the error correction information in the remaining drives.

SMC Infinite AV Editor

SMC's PC comes in the same style case as Big Red's system, the only difference being the colour. As with the Big Red, the side panel is removed simply by unclipping it. Inside is a 700MHz Athlon and 128MB of SDRAM, serviced by an IBM Deskstar 22GXP 22GB hard disk.

Dominating the front of the PC is the SoundBlaster Live! Platinum's Live Drive II, with connectors for S/PDIF and optical in and out, line in, MIDI in and out,

microphone in with level control and headphone output jack with volume.

SMC has eschewed CD-RW in favour of an OnStream DI30 tape drive. This is a commendable move, enabling system backup plus scheduled incremental backup on its 30GB tapes using the Echo software supplied.

The 17in monitor, an Iiyama Vision Master Pro 410 with Diamondtron NF flat screen, has good focus, but intensity regulation isn't up to scratch, with screen brightness varying when switching between applications.

Video editing comes courtesy of a Matrox Marvel G400-TV graphics card. This has 16MB of SGRAM, compared to the 32MB of most cards here, but includes TV tuner and it captures MJPEG video using a breakout box. Avid Cinema is the editing app, which is easy to use.

Cursor control comes from the new variety of Microsoft Intellimouse, with optical sensing – it works well at any angle, on any surface and doesn't get clogged with muck.

Considering its 700MHz processor, the AV Editor achieves a remarkably good performance in the application benchmarks, although the Marvel G400 doesn't do it many favours with 3DMark. As a video and audio-editing solution, however, SMC's Infinite AV Editor is a well thought-out machine at a fair price.

PCW DETAILS

Price £2,056 (£1,750 ex VAT)

Contact SMC 01753 550 333

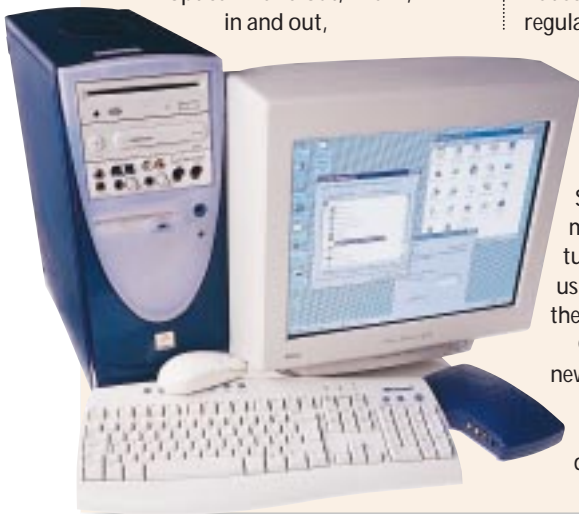
www.smc-computers.co.uk

Good points Sound card, backup drive, optical mouse, good component balance

Bad points Graphics card not so good for 3D games, not the largest hard drive

Conclusion A respectable machine with no dud components and fair speed

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



One CPU or two?

In the last year or so, clock speeds for production processors have been spiralling upwards ever faster. To achieve these speeds, Intel and AMD have moved from 0.35micron fabrication processes, down to 0.25 for Pentium II, Pentium III and K6 processors, and now down to 0.18microns for the new Coppermine Pentium IIIs and Athlons above 700MHz. In the process, they've spent billions of dollars on silicon fabrication plants.

But there is another route to faster processing that's a lot cheaper: instead of using one processor in a system and increasing the speed ever more, you simply use two, and split computing tasks between them. On the face of it, given that it's possible to use two

processors, it may seem insane to keep using one. Unfortunately, there are a few spanners in the works when it comes to SMP (symmetrical multi-processing).

The first stumbling block is that Windows 95 and 98 don't support it. A system with dual processors will run 95/98 fine, but will simply ignore one CPU. To make use of twin processors, you need to be running Windows NT or Linux, or BEOS. Second, using two processors won't magically make your applications run twice as fast. Windows NT and Linux applications need to be specifically multi-threaded, and most aren't.

This is a bit of a vicious circle: most application developers don't write multi-threaded apps because most

people don't have multiple processors, so most PC manufacturers don't bother selling dual-processor systems. In general, only higher-end professional applications, for instance Photoshop and 3D rendering packages such as LightWave, make use of multi-threading.

Whichever applications you run, however, dual processors are a boon if you often find yourself multi-tasking, since individual applications can be assigned to different processors by NT to balance the load. In this way, you can let your video-editing package churn through a complicated edit sequence in the background and carry on with your other work as normal, at full speed.

With the arrival of Windows 2000, things could

change for the better on the applications front. If, as Microsoft would like, Win2000 – which is in fact Windows NT5 – starts to replace Win98 on users' desktops, the increased customer base will give developers more of an incentive to write their applications multi-threaded.

Games developers may even start taking advantage of the possibilities that dual processing could offer. In fact, one company had already produced an SMP-capable game: id software's Quake III Arena has been optimised by programming supremo John Carmack to make use of multiple CPUs. MicroProse's MechWarrior 3 was originally slated to support it too, but the feature didn't make it into the final game.

Systemax Athlon Pro 750

The first of two Systemax machines has a 750MHz Athlon, with 128MB of SDRAM and an IBM Deskstar 34GXP 34.2GB hard drive. These are housed in a large, full-tower case that has two front-panel 5.25 bays, one internal and two 3.5in bays free, plus stacks of room to get to the CPU and two free DIMM sockets. The graphics card is a Matrox Millennium G400 MAX Dual Head, driving the Mitsubishi Diamond Pro 900u.

The quality components don't stop there – there's a SoundBlaster Live! Platinum with front-mounted Live Drive II connector bay, connected to a set of Cambridge Soundworks Desktop Theatre 5.1 speakers, with Dolby Digital capability. Other manufacturers have provided Miro's Studio DC10 Plus or a Hauppauge WinTV card to compensate for a lack of video capture, but the Systemax has both.

External peripherals also include Microsoft's wobblestastic Sidewinder Force Feedback Pro joystick, and Logitech's groovy cordless mouse and keyboard, the latter featuring shortcut

keys for IE, email client and so on. To top it all off, Microsoft Office 2000 SBE is also included.

It's not all a bed of roses though – despite the Gigabyte motherboard having a free PCI slot, the digital DIN connector for the SoundBlaster occupies the slot's blanking plate, leaving just an ISA slot free. Also, the internal wiring is rather loosely bundled and not up to the standard of some of the others.

Despite the excellent components the system had some problems where out-and-out performance was concerned, particularly in the 3DMark tests, where it scored a relatively low 4,361, although its SYSmark score was a more respectable 283.

Overall the system packs an amazing number of very high-quality components and peripherals, making its price more than justified. If you want the last word in performance, particularly where graphics are concerned, this machine won't quite fit the bill, but otherwise it's a great system that'll last for ages.



PCW DETAILS

Price £2,760 (£2,349 ex VAT)

Contact *Simply Computers*
0870 729 7366 www.simply.co.uk

Good points *Stuffed to the gills with top-notch peripherals*

Bad points *Performance doesn't live up to what we'd expect, given its specifications*

Conclusion *Extremely good value, despite the high price tag*

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Systemax Pro 733



Systemax's machines are identical in specification aside from their CPUs and motherboards. Inside the Pro 733 is a 733MHz Pentium III, nestling in a SuperMicro PIII SCD motherboard, which features Intel's 820 chipset. Not all the 820 chipset's features are supported by the board, in particular the system is fitted with a single standard 128MB SDRAM DIMM, running at 100MHz, rather than RAMBUS RDRAM. Unlike most motherboards,

however, the SuperMicro supports up to 1GB of RAM, a figure that may be common before long.

The components are housed in the same full-tower case as its AMD-based brethren, with the same IBM 22GB Deskstar hard disk and G400 MAX graphics card. The front panel houses a Pioneer DVD-ROM drive plus AOpen CD-RW drive, and the Creative Live! Drive audio I/O bay for the SoundBlaster Live! Platinum, with two front-panel 5.25in bays left free. There are also three 3.5in bays, with one nestling at the top of the case above the power supply. A benefit of the SuperMicro motherboard over the Gigabyte one in the Athlon machine, is an unused AMR slot.

The SoundBlaster's digital DIN connector can be fitted into the spare blanking plate rather than blocking a valuable PCI slot, so there's a spare PCI connector. This is just as well, since there are no shared or dedicated ISA slots on the board.

As far as performance goes, it's

not too surprising that the 733MHz PIII doesn't do as well as the 750MHz Athlon in the SYSmark benchmarks. The pairing of Intel and Matrox seems to benefit the 3DMark score, however, with the Pro 733 managing a healthy third place.

PCW DETAILS

Price £2,760 (£2,349 ex VAT)

Contact *Simply Computers*
0870 729 7366
www.simply.co.uk

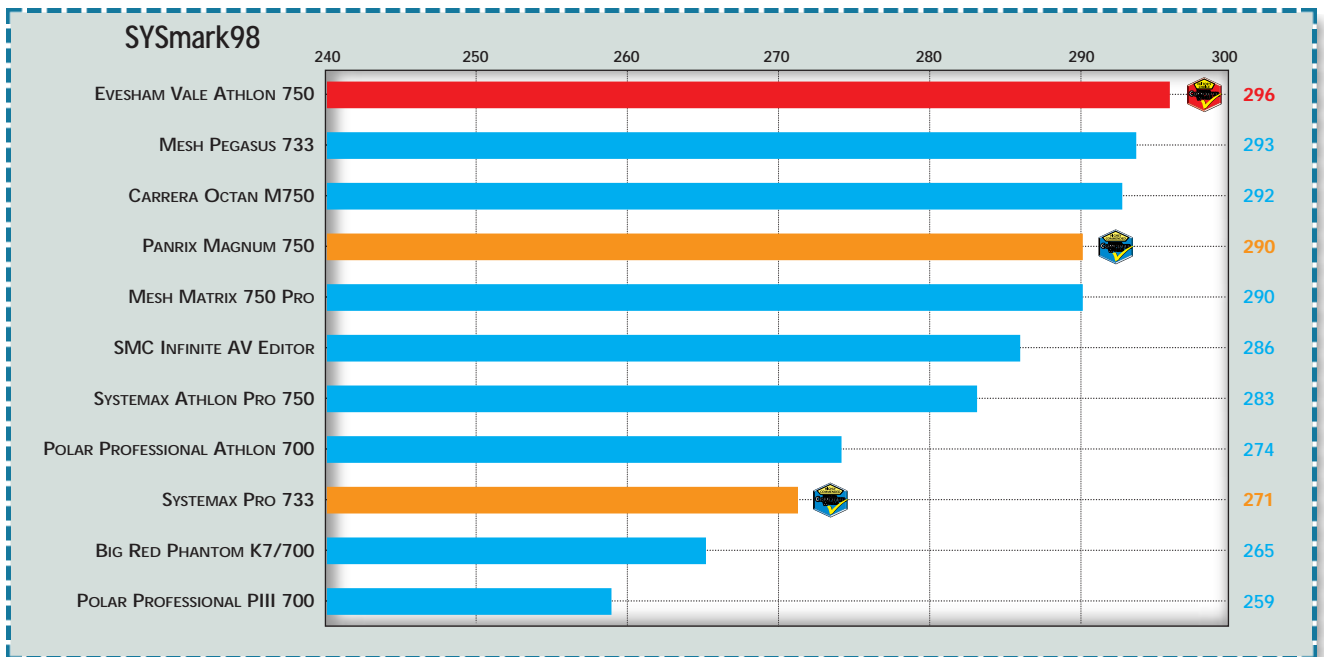
Good Points *Better graphics performance than the Systemax's Athlon system, with all the superb components*

Bad points *Lower applications benchmark score*

Conclusion *Like its cousin, this system is great value for money*

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★





How we did the tests



■ **SYSmark** measures the time it takes a PC to perform tasks in 14 common office and content-creation apps. Each test is run three times to ensure consistency. Tests include:

➤ **Office productivity:**

CorelDraw 8, Excel 97, NaturallySpeaking 2.02, Netscape Communicator 4.05, OmniPage Pro 8.0, Paradox 8, PowerPoint 97 and Word 97.

➤ **Content creation:**

MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia

Extreme 3D 2, Photoshop 4.01, Adobe Premiere 4.2, and XingMPEG Encoder 2.1.

■ **3DMark99 Max** is an instruction-set optimised version of 3DMark99 from Futuremark Corporation, which tests the 3D capabilities of PCs. When applicable, the suite of tests will draw on AMD's 3DNow! or Intel's KNI instruction sets. It uses a Real World DirectX 6.1 3D game engine to produce one result from a balanced testing methodology that includes image quali-

ty, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping. All tests are performed at 1,024 x 768 resolution in 16bit colour depth with the test suites set to loop three times. The higher the score, the better the result. However, due to the implementation of instruction-set optimisation, the results from the original 3DMark99 and the Max version are not comparable. See www.3dmark.com.

Table of features



MANUFACTURER	BIG RED	CARRERA	EVESHAM VALE	MESH	MESH
MODEL	PHANTOM K7/700	OCTAN M750	ATHLON 750	MATRIX 750 Pro	PEGASUS 733
Price (ex VAT)	£2,349 (£1,999)	£2,100 (£1,787)	£2,466 (£2,099)	£2,114 (£1,799)	£1,761 (£1,499)
Telephone	08700 711 117	0208 307 2800	0800 038 0800	0208 208 4706	0208 208 4706
Fax	08700 733 337	0208 307 2857	08707 299795	0208 208 4493	0208 208 4493
URL	www.bigred.co.uk	www.carrera.co.uk	www.evesham.com	www.meshplc.co.uk	www.meshplc.co.uk
HARDWARE SPECS					
Processor	Athlon 700MHz	Athlon 750MHz	Athlon 750MHz	Athlon 750MHz	Pentium III 733MHz
RAM/type	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
Occupied/spare RAM slots	1/2	1/2	1/2	1/2	1/2
Max memory of configuration	640MB	640MB	640MB	640MB	640MB
Max m/board-supported mem	768MB	768MB	768MB	768MB	768MB
HD (manuf & model)	IBM Deskstar 34GXP	IBM Deskstar 34GXP	Maxtor DiamondMax Plus 6800	IBM Deskstar 22GXP	IBM Deskstar 22GXP
HD size/interface	27.3GB/EIDE	34.2GB/EIDE	27.3GB/EIDE	22GB/EIDE	22GB/EIDE
Storage drive model/manuf	JVC XR-W4082	LG CED-8024B	LG CD-RW 8024B	Philips PCA460RW	Philips PCA460RW
Storage drive size/interface	650MB/EIDE	650MB/EIDE	650MB/EIDE	650MB/EIDE	650MB/EIDE
MOTHERBOARD COMPONENTS					
Motherboard manufacturer	Gigabyte	Asus	MicroStar	Asus	Tyan
Model/chipset	GA-7IX/AMD 750	K7-M/	MS6167/AMD750 AMD751+VIA VT82C686A	K7-M/	S1854/VIA Apollo Pro 133A AMD751+VIA VT82C686A
L2 cache	512KB on CPU	512KB on CPU	512KB on CPU	512KB on CPU	256KB on CPU
EXPANSION AND I/O					
3.5/5.25in bays	3/3	3/4	4/3	4/3	4/3
Free 3.5/5.25in bays	1/1	1/2	2/1	2/1	2/1
PCI/ISA/shared slots	4/1/1	4/0/1	4/1/1	4/0/1	5/0/1
Free PCI/ISA/shared slots	2/1/1	2/0/1	1/1/1	2/0/1	3/0/1
USB/serial/parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/2	4/2/1/2	2/2/1/2
MULTIMEDIA					
DVD-ROM manufacturer	Pioneer DVD-103	Panasonic SR-8584A	Pioneer DVD-114	Pioneer DVD-114	Pioneer DVD-114
DVD-ROM speed/interface	6x/EIDE	6x/EIDE	10x/EIDE	10x/EIDE	10x/EIDE
Sound card manufacturer	Creative	Creative	Creative	Creative	Creative
Sound card model	SoundBlaster Live! Player 1024	SoundBlaster Live! Value	SoundBlaster Live! Value	SoundBlaster Live! Player 1024	SoundBlaster Live! Player 1024
Speakers (manufacturer & model)	TEAC PowerMax 1000	Altec Lansing ACS54	VideoLogic DigiTheatre	Labtec LCS-2514 Audio/FX	Labtec LCS-2514 Audio/FX
Graphics card (manufacturer & model)	3dfx Voodoo3 3500TV & model)	Guillemot 3D Prophet	Guillemot 3D Prophet DDR-DVI	Matrox Millennium G400	Matrox Millennium G400 Dual Head
Graphics chipset	3dfx Voodoo3	nVidia GeForce 256	nVidia GeForce 256	Matrox G400	Matrox G400
Graphics RAM/type	16MB/SDRAM	32MB/DDR SGRAM	32MB/SDRAM	32MB/SGRAM	32MB/SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor maker & model	Mitsubishi Diamond Pro 900u	LG Studioworks 910SC	Taxan ErgoVision 980TC099	Taxan ErgoVision 980TC099	Taxan ErgoVision 755TC099
Monitor size/viewable diagonal	19in/18in	19in/18in	19in/18in	19in/18in	17in/16.1in
Max resolution/refresh	1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/85Hz	1,600x1,200/75Hz
OTHER INFORMATION					
Modem maker & model	Diamond Supra 56K	Rockwell 56K	Diamond Supra 56K	Diamond Supra 56K	Diamond Supra 56K
Misc hardware	None	None	miroVideo StudioDC10 Plus video capture card	None	None
Bundled software	Lotus SmartSuite Millennium	Lotus SmartSuite Millennium	Lotus SmartSuite Millennium	WordPerfect Office 2000	WordPerfect Office 2000
Standard warranty	1yr on-site	2yr on-site	2yr on-site	1yr on-site + 2yr RTB	1yr on-site + 2yr RTB



PANRIX	POLAR	POLAR	SMC	SYSTEMAX	SYSTEMAX
MAGNUM 750	PROF ATHLON 700	PROF PIII 700	INFINITE AV EDITOR	ATHLON PRO 750	PRO 733
£2,814 (€2,395)	£2,349 (€1,999)	£2,349 (€1,999)	£2,056 (€1,750)	£2,760 (€2,349)	£2,760 (€2,349)
01132 444 958	0800 138 1238	0800 138 1238	01753 550 333	0870 729 7366	0870 729 7366
01132 444 962	0161 482 7007	0161 482 7007	01753 524 443	0870 727 4002	0870 727 4002
www.panrix.com	www.polartechnology.com	www.polartechnology.com	www.smc-computers.co.uk	www.simply.co.uk	www.simply.co.uk
Athlon 750MHz	Athlon 700MHz	Pentium III 700MHz	Athlon 700MHz	Athlon 750MHz	Pentium III 733MHz
256MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
2/1	1/2	1/1	1/2	1/2	1/1
512MB	640MB	384MB	384MB	640MB	384MB
768MB	768MB	512MB	768MB	768MB	1GB
2xSeagate Barracuda ST328040A	Two IBM Deskstar 25GP	Two IBM Deskstar 25GP	IBM Deskstar 22GXP	IBM Deskstar 34GXP	IBM Deskstar 34GXP
57GB total/EIDE RAID	50GB total/EIDE RAID	50GB total/EIDE RAID	22GB/EIDE	34.2GB/EIDE	34.2GB/EIDE
AOpen CRW9624	Wearnes CDRW-622	Wearnes CDRW-622	OnStream DI30	AOpen CRW9624	AOpen CRW9624
650MB/EIDE	650MB/EIDE	650MB/EIDE	15GB (30GB compressed)/EIDE	650MB/EIDE	650MB/EIDE
MicroStar	Gigabyte	Intel	Gigabyte	Gigabyte	SuperMicro
MS6167/AMD750	GA-7IX/AMD 750	CC820/Intel i820	GA-7IX/AMD 750	GA-7IX/AMD 750	PIII SCD/Intel 820
512KB on CPU	512KB on CPU	256KB on CPU	512KB on CPU	512KB on CPU	256KB on CPU
4/3	5/2	5/2	3/3	5/5	5/5
1/1	2/0	2/0	1/0	3/2	3/2
4/1/1	4/1/1	5/0/0	4/1/1	4/1/1	5/0/0
1/0/1	0/1/1	1/0/0	2/1/1	0/1/0	1/0/0
2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
AOpen DVD-1040 PRO	Pioneer AO4SZ	Pioneer AO4SZ	Pioneer DVD-104	Pioneer DVD-104	Pioneer DVD-104
10x/EIDE	10x/EIDE	10x/EIDE	10x/EIDE	10x/EIDE	10x/EIDE
Creative	Creative	Creative	Creative	Creative	Creative
SoundBlaster Live! Player 1024	Ensoniq AudioPCI	Ensoniq AudioPCI	SoundBlaster Live! Platinum	SoundBlaster Live! Platinum	SoundBlaster Live! Platinum
PCWorks FourPointSurround FPS1000	Yamaha YST-M20 + YST-MSW5	Yamaha YST-M20 + YST-MSW5	Philips MMS10	Cambridge SoundWorks Desktop Theatre 5.1	Cambridge SoundWorks Desktop Theatre 5.1
Guillemot 3D Prophet Dual Head	Asus V3800 Ultra Deluxe	Asus V3800 Ultra Deluxe	Matrox Marvel G400-TV	Matrox Millennium G400 MAX Dual Head	Matrox Millennium G400 MAX Dual Head
nVidia GeForce 256	nVidia Riva TNT2 Ultra	nVidia Riva TNT2 Ultra	Matrox G400	Matrox G400MAX	Matrox G400MAX
32MB/SDRAM	32MB/SGRAM	32MB/SGRAM	16MB/SGRAM	32MB/SGRAM	32MB/SGRAM
AGP	AGP	AGP	AGP	AGP	AGP
Diamond Pro 900u	Diamond Pro 900u	Diamond Pro 900u	Iiyama Vision Master Pro 410	Diamond Pro 900u	Diamond Pro 900u
19in/18in	19in/18in	19in/18in	17in/15.9in	19in/18in	19in/18in
1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/75Hz
Diamond Supra 56K	Conexant HCF V.90	Conexant HCF V.90	Diamond Supra 56K	Rockwell 56K	Rockwell 56K
Hauppauge WinTV	PCI 10Base2/10BaseT NIC	PCI 10Base2/10BaseT NIC	None	miroVideo Studio DC10 Plus	miroVideo Studio DC10 Plus
Promise FastTrak 66 RAID controller	Promise FastTrak 66 RAID controller	Promise FastTrak 66 RAID controller	None	Hauppauge WinTV MS Sidewinder F/F Pro	Hauppauge WinTV MS Sidewinder F/F Pro
Ultrapack Vol 3 inc SmartSuite Millennium & MGI VideoWave	None	None	None	MS Office 2000 SBE	MS Office 2000 SBE
1yr on-site + 2yr RTB	3yr on-site	3yr on-site	1yr on-site	3yr on-site	3yr on-site

Editor's Choice

A short time ago, it would have been unthinkable that, given the choice, most manufacturers would supply AMD rather than Intel processors in machines submitted for a group test. But that's just what happened this month. Of the manufacturers that submitted only one PC, none chose to send a Pentium III: the Athlon was the CPU of choice. Of the 11 machines, just three were Pentium IIIs. The reasons may not be entirely down to performance. Rumours abound of Intel struggling with its yield – the amount of working CPU cores it can produce – to the extent that there are almost none available at the time of writing. But this is good news for AMD: the advanced K7 core in the Athlon can be clocked to high speeds more easily than the venerable P6 core in the Pentium III.

Processors aside, we were encouraged by the standard of the machines we received, with not a bad one among them. But we were a little disappointed that not all the manufacturers



**EVESHAM'S
ATHLON 750 EASILY
OUTSTRIPPED THE
COMPETITION IN
OUR BENCHMARKS**

relatively high price of media compared to normal CD-RS. These problems are no longer present, making CD-RW a good choice.

We were surprised not to see any DVD-RAM drives, however, since its higher capacity would make it an ideal form of backup for video projects.

that'll last a long while before you have to start thinking about upgrades.

Finally, Systemax has to get an award for its Pro 733 machine, stuffed as it was with top-of-the-range components from head to toe and turning in a good overall benchmark performance. As well as all the hardware, it was the only system to come with Microsoft Office 2000 SBE, resulting in a superb all-round machine for any task. And when the time comes to add new devices or upgrade, the capacious tower case gives enough room inside to make the job easy, as well as providing free bays for extra drives.

→ The overall award for **Editor's Choice** has to go to Evesham. The Athlon 750 packs the fastest processor around, plus the fastest graphics chipset, allied to a superb video-capture solution and a great monitor. Other machines sported similar components, but the Evesham had the right balance, plus it easily outstripped the competition in both sets of benchmark tests.

→ We also decided to hand out two **Highly Commended** accolades, the first going to Panrix for a machine that, while not as fast as the Evesham in our benchmarks, boasts an Athlon 750 with 256MB of RAM and a massive 57GB RAID hard disk array, making it a machine

**SYSTEMAX'S PRO 733 IS
A SUPERB ALL-ROUND
MACHINE**



followed our specifications – we specifically requested video capture of some sort, but Carrera and Mesh failed to deliver on this score, precluding them from winning an award despite submitting competent systems.

It's interesting to note the increasing popularity of CD-RW drives as a form of backup: every machine bar the SMC had one. Originally CD-RW was hampered by the fact that few standard CD-ROM drives could read the discs, and the

**PANRIX'S SYSTEM
OFFERS A MASSIVE
57GB RAID
HARD DISK ARRAY**





Treading the boards spots

There's no getting away from it, different processors need different motherboards. But don't panic, we've **done the hard work for you**, by looking closely at the design, features and ease of operation for a massive 30 offerings.

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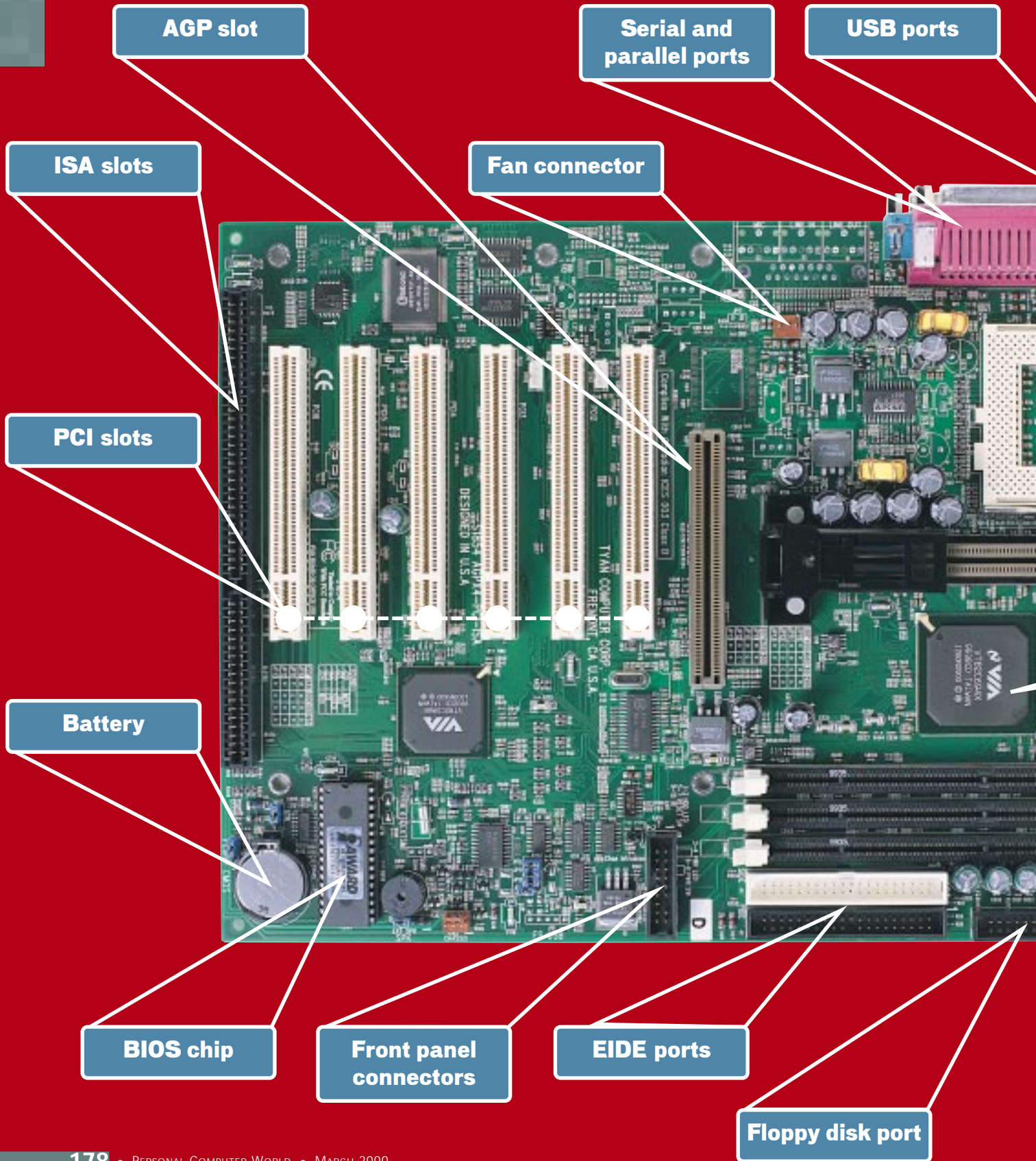
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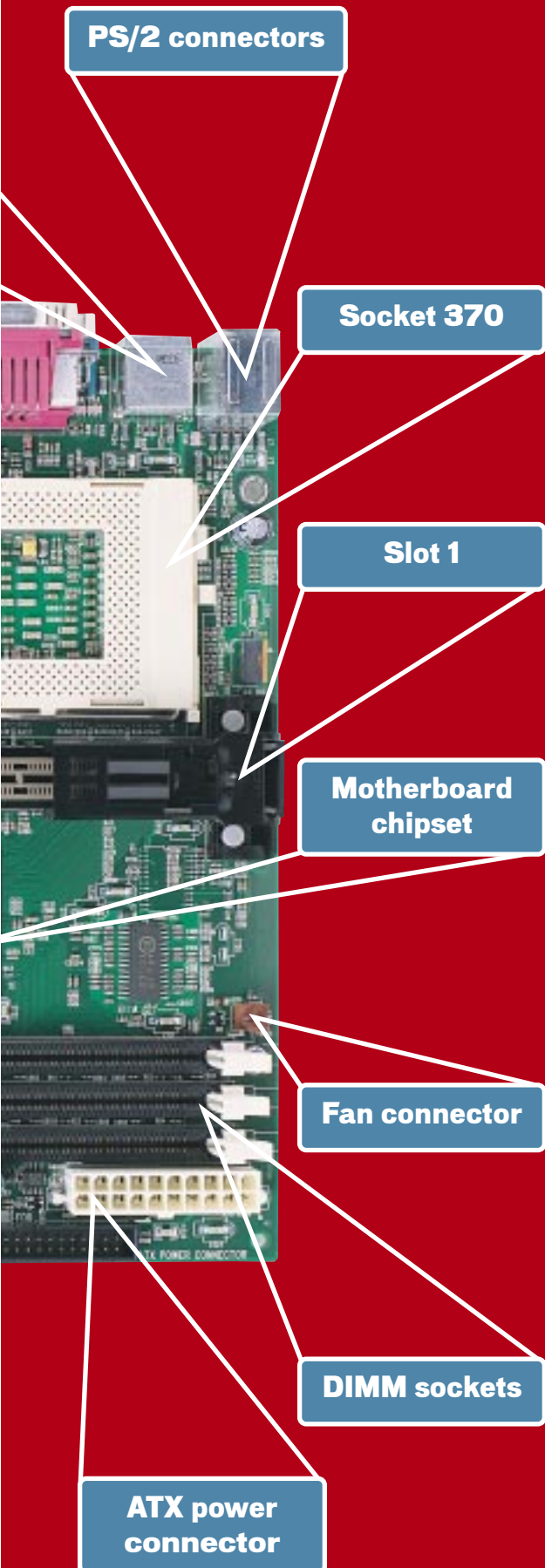
• *Motherboards tested and reviewed by Jason Jenkins and Will Head.*

The past few months have seen an explosion in the number of different types of processors available. Intel has released a huge number of new products that are built to different specifications and run at different clock speeds and front side bus speeds. On top of this, there are Athlons, Celerons and K6-IIIs. All of these processors require motherboards that are very different from each other. This month we take a look at 30 motherboards, covering all the current main processor options, and put them through our series of benchmarks. We look at which boards are laid out in the best way, which have the best documentation, which are the easiest to set up and which have the best features. Whether you've got money to burn or you're looking for a cheap option, there's something in the next few pages to suit your taste.

Anatomy of a mother



board



Glossary

AGP – Accelerated Graphics Port. An expansion slot specifically for graphics cards, offering high bandwidth.

BIOS – Basic Input Output System. Communicates between the hardware and the OS. Where all the system settings are configured and stored. A BIOS can be upgraded if new features arrive.

DIMM – Dual Inline Memory Module. A 168-pin memory stick, usually SDRAM although EDO DIMMs are still available.

EDO – Extended Data Out. The memory of choice before SDRAM arrived, now rarely seen except in older machines.

EIDE – Enhanced Integrated Device Electronics. The standard used for most hard disks and other storage devices. Most motherboards can support four EIDE devices, although some can handle eight.

FSB – Front-Side Bus. The speed at which the CPU communicates with the system memory.

ISA – Industry Standard Architecture. A 16bit expansion slot that's now almost extinct. Very few new cards are available in this format.

Parallel port – Similar to the serial port but with faster bi-directional transfer. Usually used for printers and scanners.

PCI – Peripheral Component Interconnect. A 32bit expansion slot used for the majority of expansion cards other than graphics adaptors.

POST – Power On Self Test. The first operation that is executed when the system is switched on. Checks the status of the memory, processor and other components.

RIMM – RAMBUS Inline Memory Module. The latest generation of memory, fast but also very expensive.

SCSI – Small Computer System Interface. Similar to EIDE but catering to a more professional market. Up to 15 devices can be connected and transfer rates are far superior to EIDE.

SDRAM – Synchronous Dynamic Random Access Memory. Fast system memory that superseded EDO RAM.

Serial port – Also known as com ports, serial ports are used to connect peripherals to your PC such as modems, PDAs and digital cameras.

SIMM – Single Inline Memory Module. The predecessor to the DIMM, now rarely seen. Can only be fitted to motherboards in pairs.

Slot 1 – The CPU connector for Intel Pentium III processors.

Slot A – The CPU connector for AMD Athlon processors.

Socket 370 – The CPU connector for Intel Celeron processors.

Socket 7 – The CPU connector for AMD K6-2 and III, Cyrix and WinChip processors.

SMP – Symmetric MultiProcessing. A multi-processor configuration where two or more processors share the same memory and system bus.

USB – Universal Serial Bus. The successor to serial and parallel ports. USB offers 12Mbits/sec transfer and hot swapability.

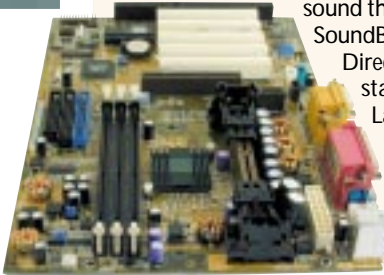
Asus K7M

Slot A

This board is the most unusual Slot A model here. Unlike the others, it uses the AMD-751 system controller on the Northbridge and VIA's VT82C686A peripheral bus controller on the Southbridge. It has room for three DIMMs and the usual four PCI slots, one AGP slot, one shared slot and one AMR slot. Thanks to the VIA

chip, there's on-board sound that supports SoundBlaster and Directsound standards.

Layout is fairly good with the EIDE ports at the side



of the board and the ATX connector towards the top. The AGP slot is far enough away from the processor and memory slots to make access to the various components very easy.

We found this board a bit tricky to set up correctly. It took some time before we could get a stable system working; much longer than it took to get the Intel machines going. The documentation is extensive, though, and fully describes all the jumper settings. The default setting is jumperless, which means you can adjust the vast majority of the settings in the AMIBIOS. It's also got the Winbond W83782D chip to monitor your PC's CPU and system voltages and its temperature. We noticed a slight performance increase over the other

Athlon boards, but it probably wouldn't be noticed by the end user.

PCW DETAILS

Price £129.25 (£110 ex VAT)

Contact Top PC 0113 242 2416

www.asus.com

Good points Good layout, jumperless settings

Bad points Unstable in our tests

Conclusion A fast Slot A board, but not the most stable

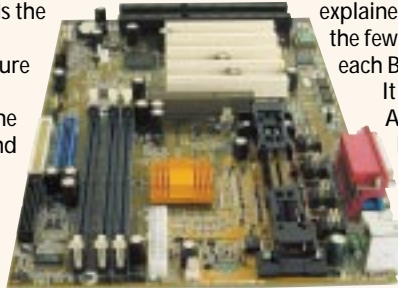
Layout	★★★★
Ease of Installation	★★
Performance	★★★★
Overall Rating	★★★

Gigabyte GA-7IX

Slot A

The GA-7IX is based on the AMD-750 chipset and has four PCI slots, one ISA and one shared, just like the MSI 6167. The ATX power and EIDE connectors are positioned well to allow for maximum tidiness inside the PC. Using the correct cable you can connect an extra two USB ports to a plug towards the bottom right of the board.

There are two temperature sensors – one that keeps an eye on the processor and one between the DIMM slots and the floppy connectors that measures the ambient temperature of your PC. This was the only Athlon board we tested that



exhibited no setup problems. It detected the correct speed of our Athlon processor and made adjustments automatically without the need to move any jumpers.

The Gigabyte GA-7IX was very stable in our tests and was not as fussy as other Slot A boards about the components it needed. The manual

explained clearly what the few jumpers do and each BIOS setting.

It only supports AGP 2X but all boards that use AMD's 751 system controller have the same problem.

Overall, it's a fantastic Athlon solution and should be a doddle to set up.

PCW DETAILS



Price £105.75 (£90 ex VAT)

Contact Dabs Direct 0800 138 5204

www.gbt-tech.co.uk

Good points Very good layout, easy to install, well-written documentation

Bad points No support for AGP 4X

Conclusion An excellent choice for Athlon processors

Layout	★★★★★
Ease of Installation	★★★★★
Performance	★★★★
Overall Rating	★★★★★

MSI 6167

Slot A

This was one of the first Athlon boards on the market and we've seen it in a good number of group test PCs. It's a tricky board to master, though, and is by no means the best Slot A offering. The layout is good – it's easy to plug all the necessary cables in and the ATX connector is in a sensible place. There are four PCI slots, one

shared and one ISA. In addition, there are three DIMM sockets for PC100 memory.

Unlike the Asus K7M, this uses the full AMD-750 chipset. This resulted in a small

performance decrease, but not so much as to dramatically affect the end user.

There's no on-board sound so you'll have to buy a sound card if you go for this option. Documentation is fair, with a comprehensive, well-written printed manual included in the retail box. Its main problem in our tests was that it was not the most stable board. It's fairly picky about the type of components you put in it, and you'd be well advised to check AMD's website for a list of approved components. When you compare it to Gigabyte's GA-7IX, the MSI's comparatively low cost seems to be less of a good deal. Generally, putting a machine together using this motherboard was a hit and miss affair and we wouldn't recommend it unless you feel very brave.

PCW DETAILS

Price £61.10 (£52 ex VAT)

Contact Dabs Direct

0800 138 5204

www.msi.com.tw

Good points Good layout and documentation

Bad points Proved unstable in our tests, lots of specialist hardware requirements

Conclusion Some good points, but overall too hit and miss for our liking

Layout	★★★★★
Ease of Installation	★
Performance	★★★★
Overall Rating	★★★



AOpen AX6C

Pentium III
133FSB

Based on Intel's new 820 chipset, this motherboard is most notable as a three-RIMM solution. All the other 820 boards here are two-RIMM models. The board was laid out fairly well, but we did have one or two complaints. The ATX power connector is in an annoying, but unfortunately common, position: next to the processor slot and a clutch of hot capacitors. This means you have to bring the power cable around the side of the processor and into the motherboard to connect it.

There are five PCI



but no ISA slots. This version comes with Analog Devices' AC97 sound on-board. It is one of the few units to have a truly jumperless design. This made it simple to set up as all the changes can be achieved through settings in the BIOS, so you don't get your hands dirty shifting jumpers or dip switches. We had a

problem with the RDRAM speed – it was automatically set to 1,000MHz, preventing the system from POSTing.

Bringing the speed down to 800MHz solved the problem. Documentation is adequate: the brief printed manual

covers most of the important points, but the online version is more detailed.

PCW DETAILS

Price £128.08 (£109 ex VAT)

Contact RK Distribution
01844 261 226 www.aopen.com

Good points Easy to set up

Bad points Layout could be better, as could the printed documentation

Conclusion A good board that has the added advantage of three RIMM sockets

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★

AOpen AX63 Pro

Pentium III
133FSB

Intel would like you to use its 820 chipset and RAMBUS memory to run its Coppermine processors, but that's not the only option. VIA has two chipsets that support a 133MHz FSB – the Apollo Pro 133 and the newer Apollo Pro 133A. The only major difference is that the latter supports AGP 4X while the former only goes as far as AGP 2X. This board has the older of the two chipsets but still managed to outperform the other Apollo Pro 133 boards in our SYSmark tests by 18 points.

In terms of layout, this AOpen board is not one of the best. The floppy connector is to the left of the processor slot, so you have to stretch your floppy cable across the processor to the drive. Having said that, the ATX power and dual

EIDE connectors are in sensible places to the right of the board. In terms of setup, though, this unit was a dream. There's no need to move any jumpers as all the adjustments can be made in the Award Modular BIOS. Our PC133 SDRAM and Pentium III 733EB ran very happily, giving us a stable system.

Documentation is not the best.

Although we hardly needed to refer to it, the booklet is only nine pages long and for anything



more than basic information, you'll need the PDF manual on the CD.

PCW DETAILS

Price £64.63 (£55 ex VAT)

Contact Dabs Direct 0800 138 5204
www.aopen.com

Good points Great performance while maintaining stability

Bad points Layout, slim documentation

Conclusion Good board but could have been even better

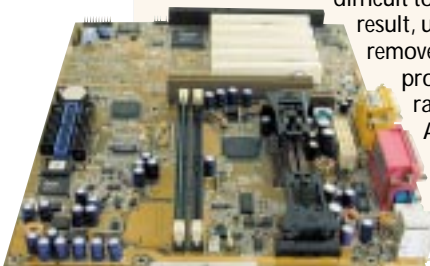
Layout	★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★

Asus P3C-E

Pentium III
133FSB

Based on the Intel 820 chipset, this model has two RIMM sockets and an on-board Yamaha 744 PCI audio controller. There's also an AGP Pro slot, four PCI slots and one shared. An Audio Modem Riser (AMR) slot sits above the AGP Pro slot just below the processor. A jumper that puts the BIOS settings back into safe mode sits between the two, and is very

difficult to move as a result, unless you remove the processor rails. The ATX power connector could be sited



better as it's adjacent to some hot capacitors and means you have to bring the power lead round some awkward components. Other than these minor niggles, however, the layout is adequate.

This motherboard was very easy to set up. By default, its jumperless mode is enabled, so you can set the speed of the CPU using the BIOS menu. If this doesn't work, however, the board has a selection of jumpers and switches to move so you can change settings manually.

Our review board only came with a six-page photocopied document, but the information on Asus' website is much more comprehensive. Asus' DIMM riser card is optional (£25 ex VAT), and this convertor sits in one of the RIMM slots and is held in place by two screws. You

can then use standard SDRAM to run Intel's Coppermine processors. Overall a good board with a few minor problems.

PCW DETAILS

Price £182.13 (£155 ex VAT)

Contact Top PC 0113 242 2416
www.asus.com

Good points DIMM riser card available as an option, easy to set up

Bad points Some jumpers hard to get to

Conclusion Not without its faults, but overall a very good 820 board

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★

Gigabyte GA-6CX

PIII
133FSB

This two-RIMM 820 solution is well designed, with slots and jumpers in appropriate places. Unfortunately, this good design is let down by poor documentation, which made installation a lot harder than it needed to be.

Our board had no ISA slots, but we have seen various versions of this board, so check the exact specs before you buy.

The AGP, RIMM, ATX and EIDE connectors are in sensible places, to allow cables to be tidily positioned inside the case. This board features Gigabyte's Dual BIOS technology, which allows for a backup BIOS to be stored in flash memory in addition to the normal BIOS. Should the primary BIOS become



corrupt, you can fall back on your secondary BIOS.

Installation was not the easiest. The board did not automatically detect a 133MHz FSB-compatible processor, and we had to force it to a 133MHz FSB by moving a jumper.

The manual contained several errors, and described a three-RIMM, rather than a two-RIMM board. We could not get the board to detect our CD-ROM as a secondary master, and had to settle for making it a slave on the primary channel.

One good thing is that you can adjust the CPU multiplier in the BIOS menu rather than moving any switches.

Overall this was a good effort, let down by a lack of attention to detail.

PCW DETAILS

Price £133.95 (£114 ex VAT)

Contact GBT Tech (UK)

01908 362 700 www.gbt-tech.co.uk

Good points Excellent layout

Bad points Tricky to install due to poor documentation, could not detect secondary EIDE channel

Conclusion A board that nearly makes it but falls at the last hurdle

Layout	★★★★★
Ease of Installation	★★
Performance	★★★★★
Overall Rating	★★★★

Supermicro Super PIISCA

PIII
133FSB

This board is targeted at people looking to upgrade and includes both DIMM and RIMM slots. Although you can't populate the motherboard with both, it gives you the option if you can't afford expensive RAMBUS memory and want to use your existing DIMMs. There's still room left for five PCI slots, an AMR slot, an AGP slot and even on-board audio.

The ATX power connector could be in a better position, but at least

it is towards the top of the board so the power lead does not have far to travel to it.

The two EIDE and floppy ports are thoughtfully placed so your ribbon cables can be tucked neatly away within the system case itself, with no need for them to cross the motherboard.

Setup was the easiest of all the 820 boards here – the BIOS detected the presence of our Pentium III 733EB straight away and adjusted itself automatically. The only slightly annoying point is that you have to screw on the processor rail yourself.

Documentation is excellent and the necessary cables, RIMM spacer, driver CD and EIDE cables are included. The AMIBIOS has useful features such as temperature monitoring and the ability

to turn the processor fan off when the system is in sleep mode.

PCW DETAILS

Price £128.08 (£109 ex VAT)

Contact Dabs Direct 0800 138 5204

www.supermicro.com

Good points RIMM and DIMM slots, good layout, easy to set up

Bad points You have to construct the processor rails yourself

Conclusion An excellent board that is aimed squarely at the upgrade market

Layout	★★★★★
Ease of Installation	★★★★★
Performance	★★★★★
Overall Rating	★★★★★



Supermicro Super PIISEA

PIII
133FSB

The PIISEA presents an unusual conundrum. On the one side it supports the latest Coppermine processors that run on a 133MHz front-side bus due to its 810E chipset. On the other side, you won't see the true benefits of this increase due to the lack of an AGP slot and mediocre on-board graphics performance. You may protect your investment by being able to upgrade to Coppermine, but to increase performance you'd be better off opting for the 820 or VIA Apollo solution.

Installation was uneventful, the board was configured by default to set the front-side bus speed. Once the processor was

installed and everything else connected up it correctly identified it as a 733MHz PIII.

The layout of components could be improved. The ATX power connector is between the processor slot and the back panel connectors, resulting in an untidy path for the cables. The second serial port connector is also nestling here, which could make using it difficult.

Unusually, the PIISEA has two ISA slots and one shared slot, as well as three PCI slots and an AMR port. Two UDMA66-compliant EIDE channels are on offer, as well as two DIMM sockets.

The back panel has connections for two PS/2, two USB, one

serial, one parallel, one D-SUB video port, one game port and audio in, out and mic.

PCW DETAILS

Price £104.58 (£89 ex VAT)

Contact Dabs Direct 0800 138 5204

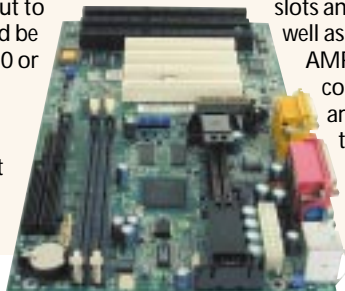
www.supermicro.com

Good points Support for 133MHz Coppermine processors

Bad points No AGP slot, awkward layout

Conclusion Although you could put a 733MHz PIII on this board, there isn't a compelling reason to do so

Layout	★★★★
Ease of Installation	★★★★★
Performance	★★★
Overall Rating	★★★



TMC TI6VG4

PIII
133FSB

This board is based on the older VIA Apollo Pro chipset, so does not support AGP 4X. Unlike the other boards based on this chipset, though, it has on-board sound, although the ports are not properly colour-coded for PC99 compliance.

The layout is good – floppy, EIDE and ATX power connectors have all been positioned in the top right of the unit. This will ensure that all the cables can be kept out of the way



of the major components and allow for a user-friendly upgrade path. There are four PCI slots and one shared slot, plus the standard single AGP slot. There's also an AMR slot that is unusually positioned below the AGP slot.

It was fairly easy to set this board up with our Pentium III 733EB processor and PC133 memory. The manual, however, said we could change the FSB speed to 133MHz through the BIOS, but we had to force this by moving a jumper. The board then detected a 733EB processor and left us with a stable machine.

Documentation was comprehensive. The AOpen AX63 Pro and this board were very close in terms of the final analysis but this one has the edge due to a better layout and documentation.

PCW DETAILS



Price £72.85 (£62 ex VAT)

Contact Dabs Direct 0800 138 5204
www.mycomp-tmc.com

Good points Good layout, good documentation

Bad points We had to force a 133MHz FSB by moving a jumper

Conclusion A good implementation of the VIA chipset that we would recommend if you don't want an 820 solution

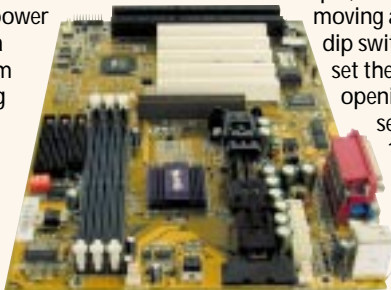
Layout	★★★★★
Ease of Installation	★★★★
Performance	★★★
Overall Rating	★★★★★

Transcend TS-AVD1

PIII
133FSB

In a similar vein as the previous board, this one is also based on VIA's Apollo Pro 133 chipset. There are quite a few differences between this offering and the others, however. It is laid out fairly well, with the EIDE and floppy connectors on the far right of the unit. The positioning of the ATX power connector might cause a problem for some system cases – you have to bring the power cable around the processor, which could be a bit awkward. Other than this though, it's fine.

There are three fan connectors that all



have status indicators in the BIOS and can be set up to independently run at different speeds. To the side of the processor is a temperature gauge that will sound an alarm if it looks like there's a danger of overheating.

Setting up this board was fairly simple, although it did involve moving a jumper and some dip switches. Once you've set the FSB to 133MHz by opening a jumper you can set it to anything from 124MHz to 150MHz in the BIOS, but you do this at your own risk. The system was very stable, but we would have liked

to have seen the ability to do it all in the BIOS as with the AOpen AX63 Pro.

PCW DETAILS

Price £53.05 (£45.15 ex VAT)

Contact Vortex Services
0161 343 5555 www.transcend.nl

Good points Good documentation, CPU warning indicator, good layout

Bad points No jumperless setting

Conclusion A good board for the price that's just beaten by others here

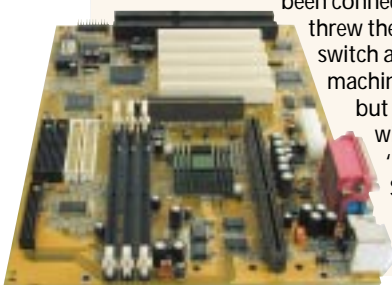
Layout	★★★★
Ease of Installation	★★★
Performance	★★★
Overall Rating	★★★★

Abit BE6

PIII
100FSB

Although the BE6-II has just been released there is still a place for the BE6. Built around the 440BX chipset, it supports Slot 1 CPUs running on a 100MHz front-side bus.

Installation started well. The CPU retaining supports needed to be fitted to each side of the slot before the processor was plugged in. After everything else had been connected up we threw the power switch and the machine POSTed but then failed with the 'Invalid System Disk' error. The BIOS



messages told us the drive was not being detected. We discovered that all drives were set to 'None' by default. Changing this to 'Auto' fixed the problem.

Unlike the BE6-II, this board only features SoftMenu II, providing less control over all the CPU settings. There is also no switch box for the multiplier setting, so you have to use the BIOS for your tweaking.

Four EIDE channels (two UDMA66 and two UDMA33) are present along with the standard floppy-drive connector. In terms of slots, you'll find one AGP, four PCI, one ISA and one shared. The back panel has two PS/2, two USB, two serial and one parallel port. Layout was good, but the ATX power connector was between the CPU slot and the rear panel connectors.

PCW DETAILS

Price £92.83 (£79 ex VAT)

Contact Top PC 0113 242 2416
www.abit.com.tw

Good points SoftMenu multiplier and bus configuration, four EIDE channels

Bad points Poorly positioned ATX power connector, drives set to 'None' in BIOS

Conclusion A good board but given the price differential between this and the BE6-II, unless you need the extra ISA slot you'd be better off with the newer model

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★

Abit BE6-II

PIII
100FSB

The BE6-II comes in a Slot 1 configuration based on the 440BX chipset. Installation was simple. After attaching the CPU

retaining supports on either side of the Slot 1, it was just a matter of connecting up the relevant parts.

The BE6-II provides two methods to specify the multiplier and clock settings. The default method is to use SoftMenu to control all the settings, allowing you to tweak things more easily than physically moving jumpers on the board. The BE6-II uses SoftMenu III, which allows even greater control over all the aspects involved in squeezing every last bit of performance out of the chip. For those who prefer to do things by hand, a set of



dip switches is provided. If these are used the SoftMenu

option is disabled in the BIOS and you have to resort to flicking switches to modify any of the settings.

The board configuration offers one AGP slot, five PCI and one ISA slot, with no shared slots. It can accommodate up to three DIMMs and three fan connectors are provided, all of which can be monitored through the BIOS.

Like its earlier sibling, the BE6-II also has four EIDE channels – allowing eight devices to be connected. There was also a temperature sensor for the processor, so that it can be monitored using software.

PCW DETAILS



Price £96.35 (£82 ex VAT)

Contact Dabs Direct 0800 138 5204

www.abit.com.tw

Good points More versatile SoftMenu configuration

Bad points One less ISA slot than the earlier BE6

Conclusion The BE6-II is a worthy successor to the BE6 and a good option if you only need one ISA slot

Layout	★★★★
Ease of Installation	★★★★★
Performance	★★★★★
Overall Rating	★★★★★

Abit WB6

PIII
100FSB

Installation of Abit's Slot 1 810E chipset solution was easy. The WB6 uses SoftMenu to control the frequency and front-side bus settings, so setup was just a matter of plugging everything in, connecting the power and pressing the on switch.

The two EIDE channels support UDMA66, but you don't get the extra UDMA33 channels as seen on the BE6 and BE6-II.

Next to these is the floppy-drive connector. The board can

hold a maximum of two DIMMs so offers limited memory upgradability. As well as the three PCI slots there is an AMR slot but no ISA slots. Unfortunately, the lack of AGP port means that the WB6 will never make a good gaming machine.

The back panel hosts two PS/2 ports, two USB, one joystick, one serial, one parallel and audio in, out and mic. A riser for the second com port is provided if you need to use both. In the shadow of the final PCI slot is a V-BUS connector that provides video out through the optional V-BUS adaptor. The latter provides both composite and S-Video output.

The layout of the WB6 could have been better. The ATX power connector is between the Slot 1 connector and the rear ports, which means the power cable

has to reach over the processor to make connection with the board.

PCW DETAILS

Price £89.30 (£76 ex VAT)

Contact Dabs Direct 0800 138 5204

www.abit.com.tw

Good points UDMA66 support

Bad points No AGP port due to 810E chipset

Conclusion Would make a good second PC, but it's not a good upgrade option

Layout	★★★
Ease of Installation	★★★★★
Performance	★★★★
Overall Rating	★★★



AOpen AX6BC Pro Gold

PIII
100FSB

The AX6BC comes in a Slot 1 flavour running the 440BX chipset. Installation was simple enough, but the board's layout could be improved. After slotting in the processor and memory, connecting up the hard drive and CD-ROM was no problem.

Unfortunately, the floppy-drive connector has been relegated to the far left of the board – in between the processor slot and the com ports. This means the floppy cable has to either drape untidily over the processor (not the coolest part of a PC system) or get tangled up with the AGP card (another potential source of heat).

The board hosts

three DIMM sockets, one AGP slot, four PCI, one ISA and a shared slot. There is support for up to four EIDE devices through two channels, although these only support UDMA33 not 66. The usual complement of two serial, one parallel, two USB and two PS/2 connectors are present. The AX6BC Pro also has an IrDA connector, but nothing is supplied to attach it to.

Front-side bus and frequency settings are configurable through the BIOS so no fiddly jumper configuration is needed. One useful

feature is that if you push the settings too far and the machine won't POST, holding

down the Home key will restore factory settings and allow the machine to boot.

PCW DETAILS

Price £91.65 (£78 ex VAT)

Contact Dabs Direct 0800 138 5204

www.aopen.com

Good points Jumperless configuration

Bad points Poorly located floppy-drive connector

Conclusion A reasonable contender but the poor placement of the floppy connector let it down

Layout	★★★
Ease of Installation	★★★★★
Performance	★★★★★
Overall Rating	★★★★★

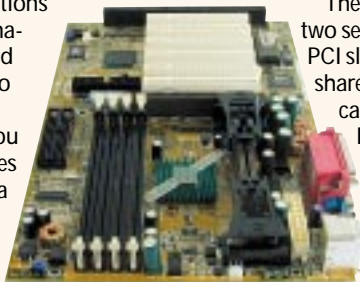


Asus P3B-F

PIII
100FSB

The 440BX Slot 1 P3B-F performed admirably, but its installation and ease of use were not the greatest. The board offers physical and BIOS CPU speed configuration. Physical configuration is done through a bank of switches – a step up from fiddly jumpers. The manual details switch configurations for many combinations of bus speed and multiplier. To select BIOS configuration, you set all the switches to off and move a specific jumper.

After plugging everything



in and connecting up the power, we set the system going, only to be presented with a blank screen. We checked everything and the system still wouldn't POST. We eventually got the system to boot and once the multiplier and frequency had been set the board behaved itself and operated consistently.

The board has two PS/2, two USB, two serial and one parallel port. Five PCI slots are on offer along with one shared slot and one AGP. The P3B-F can accommodate up to four DIMMs. The two EIDE channels conform to UDMA33, rather than the UDMA66 standard.

The layout could have been better. The ATX power connector sits awkwardly

behind the processor slot, while the floppy connector lurks between PCI slots one and two, making it difficult to reach.

PCW DETAILS

Price £111.63 (£95 ex VAT)

Contact Top PC 0113 242 2416

www.asus.com

Good points Four DIMM slots

Bad points Temperamental to set up initially, awkward layout in parts

Conclusion Once it was up and running it behaved itself, but it took some effort

Layout	★★★
Ease of Installation	★★
Performance	★★★★★
Overall Rating	★★★

Asus P3W

PIII
100FSB

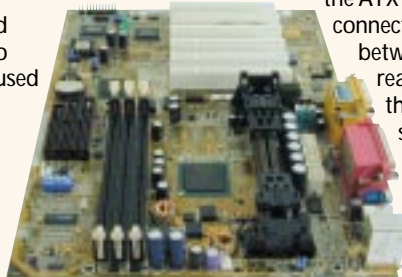
Based on the 810 chipset, this is a Slot 1-based board with a 100MHz front-side bus. You'll find six PCI slots and one AMR slot but no ISA connectors, so you won't be able to run any legacy components. There is no AGP slot, so increasing the power of the on-board graphics could be difficult. Both the EIDE channels support UDMA66 and there is a standard floppy connector adjacent. Up to three DIMM modules can be housed on the board.

The bus multiplier can be configured via the BIOS or through a bank of switches. For ease of use we opted for the software method and powered up the system. Once into the

BIOS we had to manually select the desired multiplier.

On the rear of the board there are connectors for two PS/2, two USB, one serial, one parallel, D-SUB video, joystick and audio in, out and mic. A riser card for the second serial connector is provided.

In general the layout was good, but the ATX power connector was between the rear ports and the processor slot, so putting together a tidy system could be



troublesome. It was also nestling next to some large capacitors, hindering access.

PCW DETAILS

Price £141 (£120 ex VAT)

Contact Top PC 0113 242 2416

www.asus.com

Good points Six PCI slots, jumperless configuration

Bad points No AGP slot, layout could be better

Conclusion Integrated solution but lack of AGP prevents good graphics performance

Layout	★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★

Soyo SY-6BA+IV

PIII
100FSB

This 440BX chipset board accepts Slot 1 processors running at a 100MHz front-side bus. Setting up the board, we found that the default bus speed was correct for the processor we were running and setting the multiplier was simply a matter of selecting the correct value from the BIOS menu.

The board comes with plenty of connectors for those who need a lot of components. Like some of the Abit boards, you'll find four EIDE channels,

each supporting two devices – giving you a maximum of eight separate devices. Two of the ports support UDMA66, with the other two providing UDMA33 operation. In terms of slots, there's one AGP, four PCI, one ISA and one shared. Four DIMM slots are there for the taking. A standard floppy-drive connector is near the EIDE ports.

The rear panel offers two PS/2 ports, two USB, two serial and one parallel port. Layout was fair, but the ATX power connector had been poorly placed. Sitting between the processor slot and the rear panel connectors meant that it was not in the most accessible position.

Although the BX chipset has now been around for about two years, the deficiencies of the 810 and the high price

of RAMBUS for the 820 mean that it is still a good option.

PCW DETAILS

Price £78.96 (£67.20 ex VAT)

Contact CCL Computers

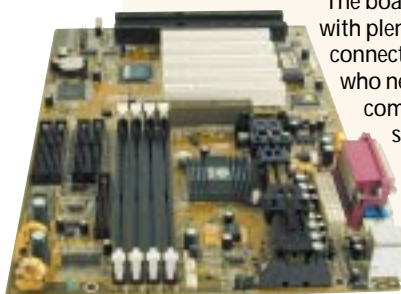
01274 269 001 www.soyo.co.uk

Good points Lots of connectors

Bad points Minor layout and installation problems

Conclusion A fair performer, but pipped at the post for an award

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★



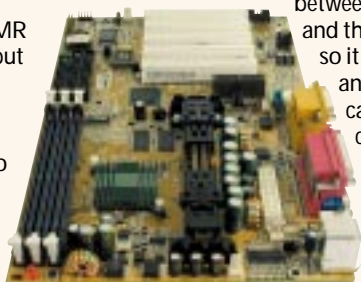
Transcend TS-AWE1

PIII 100FSB

The TS-AWE1 is built around the 810E chipset and supports Slot 1 processors. In theory it should support the latest Coppermine processors running on a 133MHz front-side bus, but we couldn't get one to work with this board, although this could have just been a problem with the sample that was sent to us for testing.

The TS-AWE1 has one AMR slot as well as five PCI slots, but no ISA slots. The two EIDE channels support UDMA66 and there is also a standard floppy-drive connector. Up to three SDRAM modules can be installed, but the lack of an AGP slot is an issue.

The rear panel



connectors are two PS/2, two USB, one serial, one parallel, one D-SUB video, one game port and audio in, out and mic. A riser is provided for the second com port so if you need to use this you don't need an extra cable.

The layout could be better. The ATX power connector lives in the space between the processor and the rear connectors so it is difficult to get to and surrounded by capacitors. The connector for the second serial port was at the end of the board after all the PCI slots, so if you didn't want it

to occupy this position in the case things could become a little untidy.

PCW DETAILS

Price £81.43 (£69.30 ex VAT)

Contact Vortex Services
0161 343 5555 www.transcendusa.com

Good points Plenty of PCI slots

Bad points No AGP slot, poor layout
Conclusion Even if you want an 810E-based board, the layout of the TS-AWE1 makes it less desirable

Layout	★★★★
Ease of Installation	★★★
Performance	★★★★★
Overall Rating	★★★★

Abit BP6

Socket 370

Celerons do not provide support for SMPs (Symmetric Multiple Processors) and therefore will not work in a dual-processor system, so why has Abit produced a board with two sockets?

SMP functionality has been removed from the Celeron. As it is based on the Pentium II, which will happily share a bus with other processors, removing this functionality without redesigning the core or stopping it working completely was troublesome. The result is that with a little modification (or a board that does this for you)



the Celeron will comply. The dual functionality of this board is for experimental and testing purposes only, but it works very well.

We only installed one processor, since Windows 98 would simply ignore the extra chip. The board itself couldn't be easier to set up. The multiplier and FSB speed are fully configurable, with SoftMenu making the process even simpler.

As well as the two sockets, the BP6 offers three DIMM slots, one AGP, four PCI, one ISA and one shared slot. It also sports four EIDE channels, so if you have a lot of devices that need to be attached, this board is ideal.

PCW DETAILS



Price £116.33 (£99 ex VAT)

Contact Top PC 0113 242 2416
www.abit.com.tw

Good points Dual-Celeron support, four EIDE channels, easy to configure and set up

Bad points None to speak of
Conclusion Even if you don't want to enter the realms of dual processing the BP6 is a powerful platform for the relatively cheap Celeron chip

Layout	★★★★★
Ease of Installation	★★★★★
Performance	★★★★★
Overall Rating	★★★★★

AOpen MX3W

Socket 370

The MX3W is a Socket 370 810 chipset-based board, manufactured in a MicroATX form factor. It has two UDMA66-compliant EIDE channels and a standard floppy-drive connector. Up to two DIMM modules can be used, so if you want the maximum upgradability then this may not be the board for you. Only three PCI slots are present, with no ISA.

The MX3W also features an AMR slot and no AGP slot, so adding a bit more oomph to the on-board



graphics could prove troublesome.

The rear panel offers two PS/2, two USB, one parallel, one serial, one joystick, audio in, out, mic and a D-SUB video connector for the on-board graphics. The second serial port is available by using the supplied riser card.

Installation was simple enough, except the board that arrived in our Labs had obviously had an exciting journey, as the pins on the fan connector were slightly bent during transit, so a minor adjustment was necessary to complete the setup.

The unusual AOpen position of the floppy-drive connector meant that the layout of the board could be improved. Rather than being near the EIDE connectors, the port was marooned on

the opposite side, forcing the floppy cable to be draped across the board.

PCW DETAILS

Price £77.55 (£66 ex VAT)

Contact Dabs Direct 0800 138 5204
www.aopen.com

Good points Simple to set up

Bad points No AGP slot, poor layout
Conclusion The MX3W will appeal to some markets, but if you want a bit more performance the lack of AGP means it just doesn't cut the mustard

Layout	★★★★
Ease of Installation	★★★★★
Performance	★★★★★
Overall Rating	★★★★

Biostar M6TWC

Socket
370

The M6TWC is Biostar's Socket 370 810 chipset-based offering. The board comes in a MicroATX form factor, reducing the overall size of the PC. Three PCI slots are available, but no ISA slots. You'll also find an AMR slot and two DIMM slots so memory upgrading may be limited. On the rear panel are two PS/2 sockets, two

USB ports, audio and joystick ports, one serial connector, one parallel port, and a D-SUB socket for the on-

board video. The second com port is on the end of a wire that can be attached to the case.

There are two EIDE channels that conform to UDMA33, although UDMA66 is available as an optional extra. In addition to the standard floppy-drive connector there are sockets for a front USB port and digital flat panel/TV adaptor card, although these were not supplied. Installation did not raise any issues and all the default jumper settings were correct for the setup we were using.

As the M6TWC comes in a MicroATX form factor, it would be suitable for those who want to build a small, reasonably cheap computer, such as a basic Internet terminal. If you wanted to use it for games, however, you'd find the lack of



AGP slot and slow on-board graphics a bit limiting.

PCW DETAILS

Price £69.33 (£59 ex VAT)

Contact TopPC 0113 242 2416
www.biostar.com.tw

Good points Small form factor

Bad points 810 graphics, limited upgradability

Conclusion You could build a good starter PC with this, but the limited upgradability may become an issue

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★
Overall Rating	★★★★

Gigabyte GA-6WMM7

Socket
370

The GA-6WMM7 supports Socket 370 Celerons using the 810 chipset. Unfortunately, installation was not easy. The board arrived set up for a 100MHz front-side bus, even though all Celerons currently operate at a 66MHz bus.

The manual said changing this was simply a matter of moving one jumper. After making the change, however, the system still wouldn't respond. A detailed trawl of the motherboard uncovered a secret jumper not mentioned anywhere in the documentation. Luckily the settings for this were written on the board and after this had been changed the system finally kicked into life.

The board comes in a MicroATX form factor and has on-board sound and

video. The Gigabyte has no AGP slot so upgrading it to decent performance for games is only possible via a PCI card.

Only two DIMM slots are available, plus two PCI, one shared slot and one AMR. In terms of ports there are two PS/2, two USB, one joystick, audio in, out and mic, one parallel and two serial. The two EIDE channels support UDMA66, there is a standard floppy connector and TV/Digital Flat Panel socket that connects to Gigabyte's custom card.



PCW DETAILS

Price £88.12 (£75 ex VAT)

Contact Watford Electronics
0800 035 5555
www.gbt-tech.co.uk

Good points Small in size

Bad points Poor documentation, difficult to set up

Conclusion If you want to build a cheap, small computer then this is worth a look, but it's not the easiest board to configure

Layout	★★★
Ease of Installation	★
Performance	★★★★★
Overall Rating	★★★

Soyo SY-71WA-F

Socket
370

The SY-71WA-F is a Socket 370 board based on the integrated 810 chipset, which seems to be the way that most Celeron boards are going. While the 810 offers advantages such as on-board sound and graphics, it also has disadvantages such as no AGP slot, so if you want to step up a gear on the

graphics front the only option is to find a PCI accelerator – which is not easy.

In addition to the on-board

D-SUB connector, there is a Digital Flat Panel (DFP) connector for use with an LCD screen. This means the signal is not needlessly converted from digital to analog and then back to digital when it reaches the screen – the whole journey is digital, reducing the chance of image degradation. The downside of the connector is that it won't fit the standard blanking plate. However, there is a replacement plate in the box.

As the two display connectors sit where you'd normally expect to find the com ports, these have been relegated to a riser plate. The back panel also sports two PS/2, two USB, one parallel, one game port and standard audio connectors.

Installation of the CPU was tricky, due to the large capacitors at the back of the

socket. The fan had to be put on 'backwards' and was difficult to attach.

PCW DETAILS

Price £82.72 (£70.40 ex VAT)

Contact CCL Computers
01274 269 001 www.soyo.co.uk

Good points Digital Flat Panel connector

Bad points 810 chipset so no AGP slot

Conclusion If you need the DFP connector and can make do with on-board graphics then the SY-71WA-F is a good buy, otherwise there are better boards

Layout	★★★
Ease of Installation	★★★★
Performance	★★★★
Overall Rating	★★★



Supermicro 370SWT

Socket 370

Supermicro has opted for the 810 chipset for its Socket 370 MicroATX board. The board offers three PCI slots but no ISA slots. As the graphics are on-board there is no AGP slot, so to get decent graphics acceleration you'll have to resort to a PCI card, such as the Voodoo3 3000 PCI version. One AMR slot is available as well as a TV-out port. Supermicro has kindly included the riser card, with TV-out connectors for composite and S-Video. The two EIDE channels are UDMA66-compliant and there is a standard floppy-drive connector. A maximum of two DIMM modules can be



installed, so it is best to buy as big a capacity as you can afford at the time.

The back panel has the usual array of ports: two PS/2, two USB, one serial, one parallel, one D-SUB video, one joystick and audio in, out and mic. If you need more com ports there is an internal connector for the second port, although no riser card was provided for this, so you'll have to go hunting in computer shops if this is a major requirement.

The installation was simple, with no jumper changes having to be made. The layout of the board was logical, with everything easily accessible.

PCW DETAILS

Price £81.08 (£69 ex VAT)

Contact Dabs Direct 0800 138 5204

www.supermicro.com

Good points TV-out included in the box

Bad points 810 graphics solution, no AGP port

Conclusion You could build a decent second PC, and the TV-out is a bonus, but if you need more power then there are more suitable boards

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★
Overall Rating	★★★★

TMC M17WBM

Socket 370

TMC's Socket 370 offering is built around the integrated 810 chipset. The board comes in a MicroATX form factor, so if you want a base to build a small second PC on, the M17WBM could be a contender.



The board has three PCI connectors and no ISA slots, so you'll have to leave your legacy cards

gathering dust if you opt for this board. No AGP slot is present, so bumping up the on-board graphics could be a

problem. One AMR slot is available and up to a maximum of two DIMM modules can be added. Both the EIDE channels support UDMA66 and there is a standard floppy-drive connector.

Layout of the board is good with most components sensibly placed to allow for tidy installation. The connectors on offer at the rear take the form of two PS/2, two USB, one serial, one parallel, one D-SUB video, one joystick port and audio in, out and mic. A riser card for the second com port is supplied in the box.

The M17WBM was simple to set up. As default the board is configured to automatically detect the bus speed, although you can force it to a 100MHz bus by changing a jumper. The multiplier settings can be modified through the

BIOS, which features a 'safe mode' boot if you happen to push the system too far.

PCW DETAILS

Price £83.43 (£71 ex VAT)

Contact Dabs Direct 0800 138 5204

www.mycomp-tmc.com

Good points Jumperless configuration

Bad points 810 on-board graphics, no AGP slot

Conclusion A good board to build a small second PC, but not really a viable upgrade option

Layout	★★★★★
Ease of Installation	★★★★
Performance	★★
Overall Rating	★★★

Tyan Trinity S1854

Socket 370

If you like to have a finger in as many pies as possible then Tyan has a board for you. The S1854 offers both Slot 1 and Socket 370 connectors (although not in a dual-processor configuration) and is based on the VIA Apollo Pro 133A chipset. A lot of rumours claim this board supports the

Socket 370 PIII, but apparently you'll have to wait for revision three.

Until then we made do with a Celeron.

Setup involved using



jumpers to set the multiplier, which is fiddly and could have been done with switch blocks or software-controlled options. The manual did not specify the configuration for a multiplier of 7.5, which the 500MHz Celeron requires, so we set it to 7. Since the Celeron is multiplier-locked this wasn't an issue. Another problem was that pin one on the front panel connector had been incorrectly labelled.

As the S1854 uses the Apollo Pro 133A chipset, it supports AGP 4X as well as 2X cards. There are five PCI slots, one shared and three DIMMs for memory. The two EIDE channels support UDMA66, with a standard floppy connector next door. The back panel has ports for two PS/2, two USB, two serial and one parallel.

PCW DETAILS

Price £92.83 (£79 ex VAT)

Contact Top PC 0113 242 2416

www.tyan.com

Good points Socket 370 and Slot 1. AGP 4X support

Bad points Not the easiest to set up, incorrectly labelled front panel connector

Conclusion A good board if you can't decide which processor format to go for. If the next revision supports the Flip Chip as well, it'll be a winner

Layout	★★★★★
Ease of Installation	★★★★
Performance	★★★
Overall Rating	★★★★

AOpen AX59 Pro



Socket 7 This Super Socket 7 motherboard is based on the VIA MVP3 chipset, which can support up to 2MB of on-board cache. This board comes with either 1MB or 512KB, so check before you buy. It has the advantage of accepting both SIMMs and DIMMs – there are two SIMM and three DIMM slots.

The board is not one of the best laid out, though. The ATX power and floppy connectors are both located below the SIMM slots, making it awkward to connect the power lead and resulting in a messy floppy cable stretching across the whole board. The two EIDE connectors are located on the far right of the board,

however, which makes up slightly for the poor positioning of the other connectors. In common with all of

the other Socket 7 boards, this does not have a jumperless setting and you have to set the CPU core and I/O frequencies by moving a series of dip switches and jumpers. This can be a bit tedious, and is more time-consuming than the software settings found in the other sections of this group test. We tested all the Socket 7 boards with a K6-III 450MHz, but this model will also accept K5, K6-2 and other Cyrix and Intel chips.

The documentation was fair but, once again, AOpen provides only the briefest of

printed manuals with more comprehensive versions on the CD and website.

PCW DETAILS

Price £66.98 (£57 ex VAT)

Contact Dabs Direct 0800 138 5204
www.aopen.com

Good points Fastest performing board

Bad points Poor design and inadequate manual

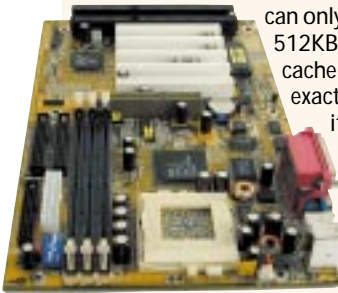
Conclusion A fair Socket 7 board, but there are better designed ones available

Layout	★★
Ease of Installation	★★★
Performance	★★★★★
Overall Rating	★★★

Gigabyte GA-5AX

Socket 7 The second entry in our Socket 7 section is based on the ALI Aladdin V chipset. This had a few problems when it was first released but these have largely been solved in various new revisions. The only real difference between this chipset and the VIA MVP3 is that this can only support 512KB of on-board cache, which is exactly the amount it has.

This model is laid out well, with EIDE, floppy and ATX connectors in



sensible positions that allow for a tidy system, with wires kept out of the way. Our only complaint is that the DIMM slots are placed a tad too near the AGP slot, so you can't insert/remove memory and still have the AGP card in the slot.

Setting up the board was a bit fiddly as we had to move a succession of dip switches and jumpers. Once we established the correct settings, however, it was fairly stable. In common with the other Socket 7 boards, though, there were a few random moments of instability that made us wary of recommending the K6-III as a good option if you're thinking of building a system. On a more positive note, there is a temperature sensor underneath the CPU socket, which automatically slows it down if it runs too

hot. All in all, the GA-5AX is a good board that is well supported.

PCW DETAILS

Price £61.10 (£52 ex VAT)

Contact Dabs Direct 0800 138 5204
www.gbt-tech.co.uk

Good points Well laid out, good documentation

Bad points More stable than others, but still a few problems

Conclusion A good, stable implementation of Socket 7 technology

Layout	★★★★
Ease of Installation	★★★★
Performance	★★★
Overall Rating	★★★★

TMC TI5VGA

Socket 7 This board was one of the easiest for us to set up, and it's fairly well laid out and stable too. TMC has used a slightly refined version of VIA's MVP3 chipset, which allows it to support UDMA66. It comes with a massive 2MB of cache on-board.

It's the only Super Socket 7 to come with on-board sound, although unfortunately the ports are not correctly colour-coded for PC99 compliance. One point that may cause a problem for some people is the fact that there are no ISA slots, although you do get a whopping six PCI slots for your money. Layout is generally good, except for



the poor positioning of the ATX power connector. It's right next to the DIMM slots and between a series of capacitors, which makes the building process a bit more fiddly than it needs to be.

The supplied manual was well written and spelt out all the possible settings in depth. After moving the various jumpers and dip switches, we didn't encounter the random instability problems that we did with the other Socket 7 boards. The Award Modular BIOS isn't the most user-friendly BIOS available, but it's the most common and gives you a high degree of control over your system.

Overall, this is a good board and one we would recommend for anyone considering building a K6-III system.

PCW DETAILS

Price £81.08 (£69 ex VAT)

Contact Top PC 0113 242 2416
www.mycomp-tmc.com

Good points Easy to install, on-board sound

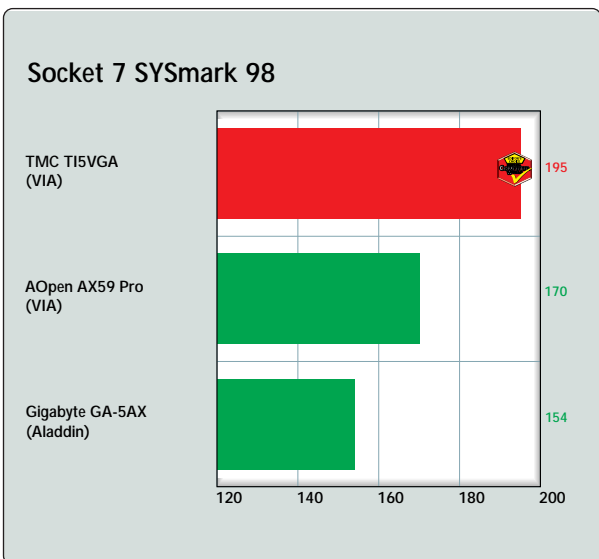
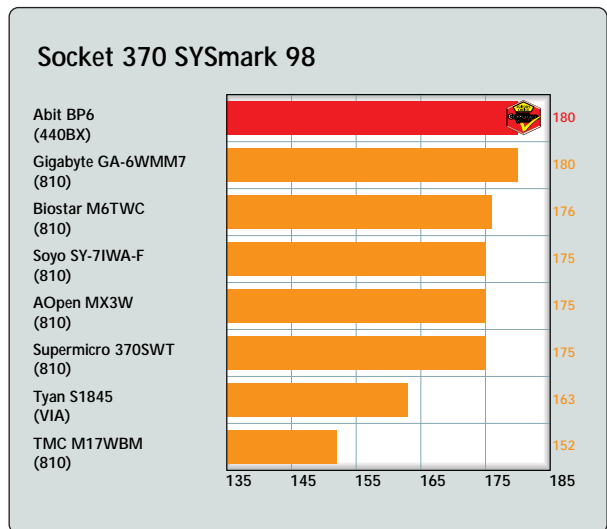
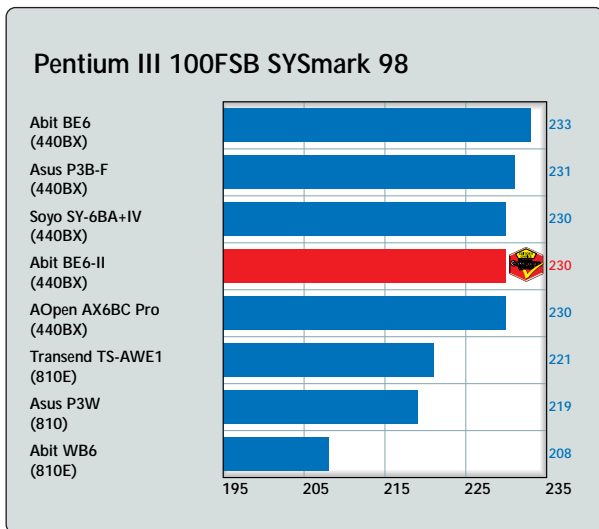
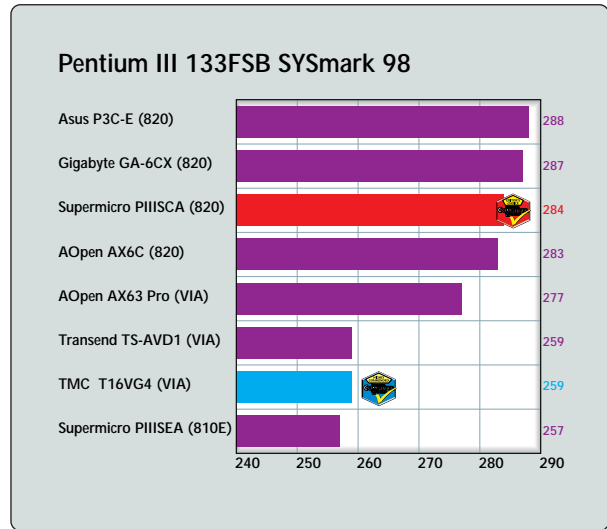
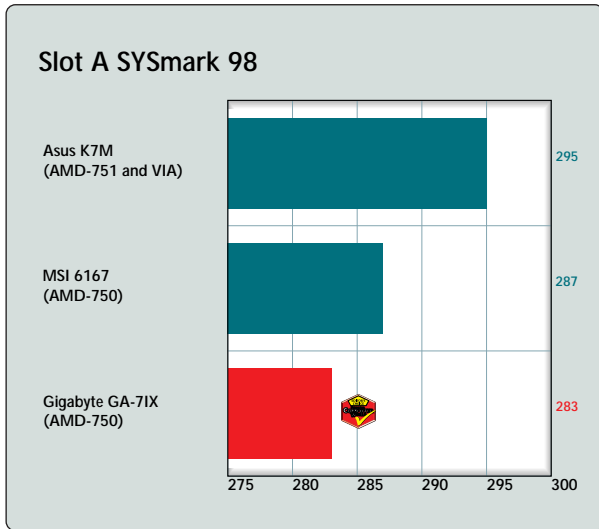
Bad points ATX power connector could be better positioned

Conclusion An excellent Socket 7 board


Layout	★★★★
Ease of Installation	★★★★
Performance	★★★★★
Overall Rating	★★★★★



Performance results



How we did the tests



We assembled each machine as we felt the end user would approach it, relying on the supplied documentation to guide us through the various connections and jumper changes. Each system was built using a 13GB 7,200 rpm IBM Deskstar hard drive and a 16MB AOpen TNT2 Ultra graphics card, apart from the Socket 7 boards, where a 32MB Asus TNT2 Ultra was used. 128MB of the appropriate memory (PC100, PC133 or RAMBUS) was added. Using a fresh install of Windows 98 SE we set SYSmark 98 to run three times at a resolution of 1,024 x 768 in 16bit colour and noted the results.



Table of features

Table of features	SLOT A			PIII 133FSB			
	K7M	GA-71X	6167	AX6C	AX63 PRO	P3C-E	GA-6CX
MANUFACTURER	ASUS	GIGABYTE	MSI	AOPEN	AOPEN	ASUS	GIGABYTE
Price inc VAT (ex VAT)	£129.25 (€110)	£105.75 (€90)	£61.10 (€52)	£128.08 (€109)	£64.63 (€55)	£182.13 (€155)	£133.95 (€114)
Supplier	Top PC	Dabs Direct	Dabs Direct	RK Distribution	Dabs Direct	Top PC	GBT Tech (UK)
Telephone	0113 242 2416	0800 138 5204	0800 138 5204	01844 261 226	0800 138 5204	0113 242 2416	01908 362 700
URL	www.asus.com	www.gbt-tech.co.uk	www.msi.com.tw	www.aopen.com	www.aopen.com	www.asus.com	www.gbt-tech.co.uk
Slot/socket type	Slot A	Slot A	Slot A	Slot 1	Slot 1	Slot 1	Slot 1
Processor types	Athlon	Athlon	Athlon	All Pentium III	All Pentium III	All Pentium III	All Pentium III
Chipset	AMD-751/VIA VT82C686A	AMD-750	AMD-750	Intel 820	VIA Apollo Pro 133	Intel 820	Intel 820
Form factor	ATX	ATX	ATX	ATX	ATX	ATX	ATX
Front-side bus speeds	100MHz	100MHz	100MHz	100MHz/133MHz	100MHz/133MHz	100MHz/133MHz	100MHz/133MHz
AGP/PCI/shared/ISA slots	1/4/1/0	1/4/1/1	1/4/1/1	1/5/0/0	1/4/1/1	1/4/1/0	1/5/0/0
PS/2/USB/serial/parallel slots	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1
SIMM slots	0	0	0	0	0	0	0
DIMM slots	3	3	3	0	3	0	0
RIMM slots	0	0	0	3	0	2	2
On-board sound	✓	✗	✗	✓	✗	✓	✓
AMR slot	✓	✗	✗	✓	✗	✓	✓
EIDE channels	2	2	2	2	2	2	2
Wake on LAN	✓	✓	✓	✓	✓	✓	✓
Other connectors	IR/USB	IR/USB	IR/USB	IR	IR	IR	IR/USB
BIOS type	AMIBIOS	Award	Award	Award	Award	Award	Award
AGP speeds	1X/2X	1X/2X	1X/2X	1X/2X/4X	1X/2X	1X/2X/4X	1X/2X/4X
No. of fan connectors	2	3	3	3	2	3	3
On-board graphics	✗	✗	✗	✗	✗	✗	✗
Jumperless/Soft BIOS	✓	✓	✓	✓	✓	✓	✓



Table of features

Table of features	PIII 100FSB				SOCKET 370		
	P3B-F	P3W	SY-6BA+IV	T5-AWE-1	BP6	MX3W	M16TWC
MANUFACTURER	ASUS	ASUS	SOYO	TRANSCEND	ABIT	AOPEN	BIOSTAR
Price ex VAT	£111.63 (€95)	£141 (€120)	£78.96 (€67.20)	£81.43 (€69.30)	£116.33 (€99)	£77.55 (€66)	£69.33 (€59)
Supplier	Top PC	Top PC	CCL Computers	Vortex Services	Top PC	Dabs Direct	Top PC
Telephone	0113 242 2416	0113 242 2416	01274 269 001	0161 343 5555	0113 242 2416	0800 138 5204	0113 242 2416
URL	www.asus.com	www.asus.com	www.soyo.co.uk	www.transcend.nl	www.abit.com.tw	www.aopen.com	www.biostar.com.tw
Slot/socket type	Slot 1	Slot 1	Slot 1	Slot 1	2x Socket 370	Socket 370	Socket 370
Processor types	100MHz Pentium III	100MHz Pentium III	100MHz Pentium III	All Pentium III	All Celeron	All Celeron	All Celeron
Chipset	Intel 440BX	Intel 810	Intel 440BX	Intel 810E	Intel 440BX	Intel 810	Intel 810
Form factor	ATX	ATX	ATX	ATX	ATX	Micro ATX	Micro ATX
Front-side bus speeds	100MHz	100MHz	100MHz	100MHz/133MHz	100MHz	100MHz	100MHz
AGP/PCI/shared/ISA slots	1/5/1/0	0/6/0/0	1/4/1/1	0/5/0/0	1/4/1/1	0/3/0/0	0/3/0/0
PS/2/USB/serial/parallel slots	2/2/2/1	2/2/1/1	2/2/2/1	2/2/1/1	2/2/2/1	2/2/1/1	2/2/1/1
SIMM slots	0	0	0	0	0	0	0
DIMM slots	4	3	4	3	3	2	2
RIMM slots	0	0	0	0	0	0	0
On-board sound	✗	✓	✗	✓	✗	✓	✓
AMR slot	✗	✓	✗	✓	✗	✓	✓
EIDE channels	2	2	4	2	4	2	2
Wake on LAN	✓	✓	✓	✓	✓	✓	✓
Other connectors	IR	IR	IR	IR/COM2	IR	IR/COM2	IR/COM2/USB
BIOS type	Award	Award	Award	Award	Award	Award	Award
AGP speeds	1X/2X	N/A	1X/2X	N/A	1X/2X	N/A	N/A
No. of fan connectors	3	3	3	3	3	2	1
On-board graphics	✗	✓	✗	✓	✗	✓	✓
Jumperless/Soft BIOS	✓	✓	✓	✗	✓	✓	✓



PIII 133FSB					PIII 100FSB			
SUPER PIII5CA	SUPER PIII5EA	T16VG4	TS-AVD1	BE6	BE6-II	WB6	AX6BC Pro GOLD	
SUPERMICRO	SUPERMICRO	TMC	TRANSCEND	ABIT	ABIT	ABIT	AOPEN	
£128.08 (£109)	£104.58 (£89)	£72.85 (£64)	£53.05 (£45.15)	£92.83 (£79)	£96.35 (£82)	£89.30 (£76)	£91.65 (£78)	
Dabs Direct	Dabs Direct	Dabs Direct	Vortex Services	Top PC	Dabs Direct	Dabs Direct	Dabs Direct	
0800 138 5204	0800 138 5204	0800 138 5204	0161 343 5555	0113 242 2416	0800 138 5204	0800 138 5204	0800 138 5204	
www.supermicro.com	www.supermicro.com	www.mycomp-tmc.com	www.transcend.nl	www.abit.com.tw	www.abit.com.tw	www.abit.com.tw	www.aopen.com	
Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	
All Pentium III	All Pentium III	All Pentium III	All Pentium III	100MHz Pentium III	100MHz Pentium III	All Pentium III	100MHz Pentium III	
Intel 820	Intel 810E	VIA Apollo Pro 133	VIA Apollo Pro 133	Intel 440BX	Intel 440BX	Intel 810E	Intel 440BX	
ATX	ATX	ATX	ATX	ATX	ATX	MicroATX	ATX	
100MHz/133MHz	100MHz/133MHz	100MHz/133MHz	100MHz/133MHz	100MHz	100MHz	100MHz/133MHz	100MHz	
1/5/0/0	0/3/1/2	1/4/1/0	1/4/1/1	1/4/1/1	1/5/0/1	0/3/0/0	1/4/1/1	
2/2/2/1	2/2/1/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/1/1	2/2/2/1	
0	0	0	0	0	0	0	0	
2	2	3	3	3	3	2	3	
2	0	0	0	0	0	0	0	
✓	✓	✓	✗	✗	✗	✓	✗	
✓	✓	✓	✗	✗	✗	✓	✗	
2	2	2	2	4	4	2	2	
✓	✓	✓	✓	✓	✓	✓	✓	
IR	COM2/IR	IR	IR	IR	IR	IR/COM2	IR	
AMIBIOS	AMIBIOS	Award	Award	Award	Award	Award	Award	
1X/2X/4X	N/A	1X/2X	1X/2X	1X/2X	1X/2X	N/A	1X/2X	
3	2	3	3	3	3	2	2	
✗	✓	✗	✗	✗	✗	✓	✗	
✓	✓	✓	✓	✓	✓	✓	✓	



SOCKET 370					SOCKET 7			
GA-6WM7	SY-71WA-F	370SWT	M17WBM	TRINITY S185.4	AX59 PRO	GA-5AX	T15VGA	
GIGABYTE	SOYO	SUPERMICRO	TMC	TYAN	AOPEN	GIGABYTE	TMC	
£88.12 (£75)	£82.72 (£70.40)	£81.08 (£69)	£83.43 (£71)	£92.83 (£79)	£66.98 (£57)	£61.10 (£52)	£81.08 (£69)	
Watford	CCL Computers	Dabs Direct	Dabs Direct	Top PC	Dabs Direct	Dabs Direct	Top PC	
0800 035 5555	01274 269 001	0800 138 5204	0800 138 5204	0113 242 2416	0800 138 5204	0800 138 5204	0113 242 2416	
www.gbt-tech.co.uk	www.soyo.co.uk	www.supermicro.com	www.mycomp-tmc.com	www.tyan.com	www.aopen.com	www.gbt-tech.co.uk	www.mycomp-tmc.com	
Socket 370	Socket 370	Socket 370	Socket 370	Socket 370/Slot 1	Socket 7	Socket 7	Socket 7	
All Celeron	All Celeron	All Celeron	All Celeron	All Pentium III & Celeron	K6, Cyrix, WinChip	K6, Cyrix, WinChip	K6, Cyrix, WinChip	
Intel 810	Intel 810	Intel 810	Intel 810	VIA Apollo Pro 133A	VIA MVP3	AlI Aladdin V	VIA MVP3	
Micro ATX	ATX	Micro ATX	Micro ATX	ATX	ATX	ATX	ATX	
100MHz	100MHz	100MHz	100MHz	100MHz/133MHz	100MHz	100MHz	100MHz	
0/2/1/0	0/5/0/0	0/3/0/0	0/3/0/0	1/5/1/0	1/3/1/1	1/4/1/1	1/6/0/0	
2/2/1/1	2/2/0/1	2/2/1/1	2/2/1/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	
0	0	0	0	0	2	0	0	
2	3	2	2	3	3	3	3	
0	0	0	0	0	0	0	0	
✓	✓	✓	✓	✗	✗	✗	✓	
✓	✓	✓	✓	✗	✗	✗	✗	
2	2	2	2	2	2	2	2	
✓	✓	✓	✓	✓	✓	✓	✓	
IR/COM2/USB	IR/COM1/COM2	IR/COM2	IR/COM2	IR	✗	IR	IR	
Award	Award	Award	Award	Award	Award	Award	Award	
N/A	N/A	N/A	N/A	1X/2X/4X	1X/2X	1X/2X	1X/2X	
3	3	3	3	3	3	1	3	
✓	✓	✓	✓	✗	✗	✗	✗	
✓	✓	✓	✓	✓	✗	✗	✗	

Editor's Choice

Due to the massive array of motherboards and processors available, we've decided to give six awards this month – so that you can easily see what the best motherboard option is at the various price and CPU points.

Starting with the big boys, our first **Editor's Choice** goes to **Gigabyte's GA-71X** Slot A motherboard.

We generally had a difficult time testing our Athlon boards and it was a welcome relief to find a board that we could set up and use with minimum effort. This board produced a stable system first time and there are fewer hardware compatibility issues to worry about. On top of that, it is well laid out and has useful extra features such as temperature monitoring. All in all, it's the only board we would recommend for Athlon enthusiasts.

The next behemoth chip, the Pentium III 733EB, is the most interesting story to come out of this group test. The chip itself has been floating around the PCW offices for quite some time now, but there have been few motherboards to put it on until very recently. Two standards have emerged. There's Intel's approved version, that couples its 820 chipset with RAMBUS memory, and VIA's solution, that uses affordable PC133 memory with the Apollo Pro 133 chipset.

You get the best performance from the first solution, and for this reason we've awarded the **Editor's Choice** in

this section to the **Supermicro Super PIIISCA**. Not only is it well laid out and documented, it was incredibly easy to set up – we simply plugged the components in and off we went. RAMBUS is still



GIGABYTE GA-71X

horribly expensive, though (at the time of writing it was around £650 for 128MB 800MHz RIMM), and so the real bonus is that you can put SDRAM

in it as an alternative to RAMBUS.

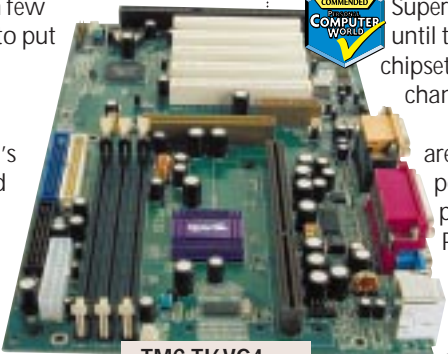
If you don't want to choose an Intel

solution, though, there's always the **Highly Commended TMC TI6VG4**. Not only is the board itself an absolute bargain at £62 ex VAT, it's also very easy to set up and comes with good supporting documentation. Our only bugbear is that it

doesn't support AGP 4X, so if you feel you need this feature then you're going to have to opt for the Supermicro Super PIIISCA until the Apollo Pro 133(A) chipset filters through the channel.



SUPERMICRO SUPER PIIISCA



TMC TI6VG4

For those of you who aren't after the most powerful processors, a Pentium III 600 could still be a good option.

For this, we'd recommend the **Abit BE6-II** which also grabs an **Editor's Choice** award.

Based on the faithful old 440BX chipset,

it impressed us most with its SoftMenu III that gives you the best control over all of the settings that you could ever need.

Super Socket 7 hasn't received much attention recently, but there are still plenty of processors you can use for it. K6-IIIs are not as easy to set up as some of the other processors here, but they do offer good

performance for a comparatively low cost. Our **Editor's Choice** in this section goes to **TMC's TI5VGA**. It was

the best laid out and easy to configure of all the Super Socket 7 boards and

comes with 2MB of on-board cache and on-board sound.

Our last **Editor's Choice** award goes to **Abit's BP6**. The company has come up with a hack that

enables two Celeron processors to run together on one board. If you use an operating system that supports it, such as Windows 2000, you'll see a massive performance increase with optimised

software. It's an extremely easy board to set up and you can use the Softmenu to adjust all the settings without moving jumpers. It's the ultimate board for the PC enthusiast who wants a powerful

system but not pay over the odds for it and as such we thoroughly recommend it.

Finally, a word of thanks must go to Carrera, AMD, Intel, AOpen, Kingston, Top PC and Techworks for supplying us with the hardware

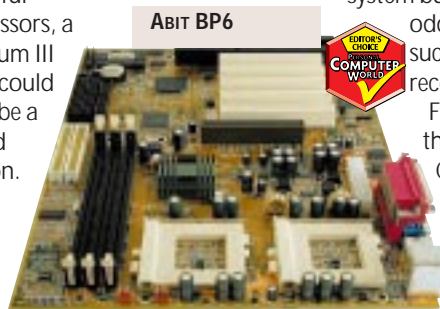
needed to perform this test.



ABIT BE6-II



TMC TI5VGA



ABIT BP6



Hold the front page

Do you want to do your own publishing? **Give the designer in you a free hand** and check out what we've got to say on both the small user and professional packages available. Ken McMahon reports.

O f all the design-based activities that have benefited from digital technology, desktop publishing is the most mature. DTP was born in 1985, with the release of PageMaker for the Apple Mac – the Windows version followed two years later. Thirteen years on and things look very different. The basic activity of arranging words and pictures on the page remains, but the tools with which that task is accomplished have changed, in method and scope, beyond recognition.

As with most design activities the market has divided into two.

Professional packages, costing anything from £200 to more than £1,000, provide the means to produce commercial colour publications of any length and technical complexity. This market is dominated by Quark XPress which is used to design and produce artwork for the vast majority of magazines, books, mailers, advertisements and other paper-based publications all over the world. *PCW* is produced using XPress. But Adobe hopes to wrestle a sizeable chunk of this market away from Quark with InDesign which it released in September last year.

For those who want to produce publications at home and business users whose occasional need for stationery and marketing materials doesn't justify the cost and time investment required by a professional package, there is an increasing range of applications, or more commonly software suites, available that score highly in the usability stakes. Although these are less powerful and flexible than their professional counterparts, they are becoming increasingly sophisticated, with advanced typographical features, the ability to create and edit graphics and output for four-colour and spot-colour printing.

Given their increasing sophistication, ease of use has become an important differentiating factor. They all provide some form of help and guidance as well as a collection of templates for common design projects. It is the standard of these materials and guidance as well as the quality of the interface that separates the excellent from the merely adequate.

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• DTP packages reviewed by Ken McMahon.

Adobe InDesign

At last, a product worthy of **issuing a challenging** to the redoubtable Quark XPress.

In June 1999, when we last looked at desktop publishing packages, we evaluated an early beta copy of Adobe InDesign. It looked very good, and since its release last October, it has lived up to its early promise.

InDesign's market is easily defined. It is aimed at people and organisations that currently use Quark XPress.

Ordinarily, gaining a foothold in a market dominated by a virtual monopolist wouldn't be easy. Adobe's 'in' is that it produces other fundamental packages for design and production - Photoshop and Illustrator.

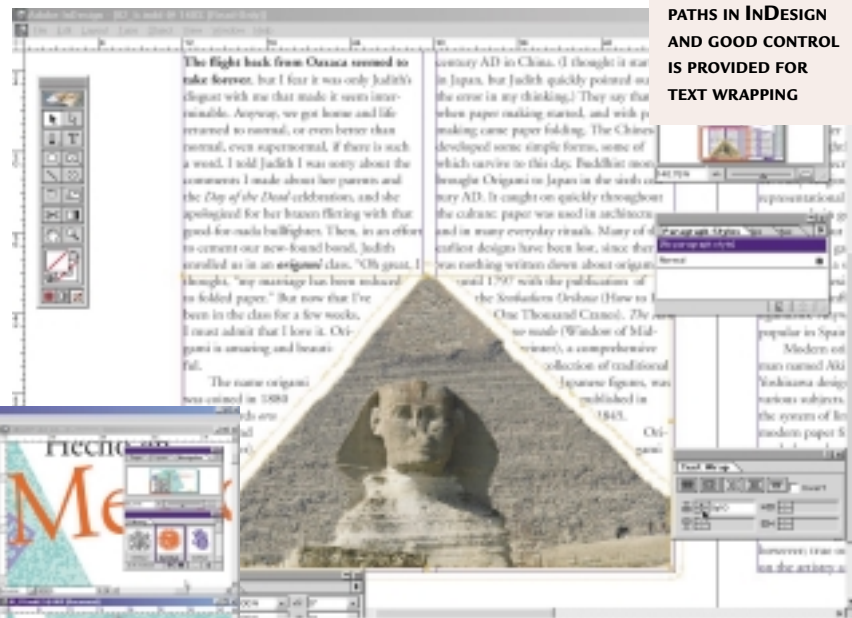
Secondly, it developed PostScript - the page description language for creating output on everything from a humble 300dpi laser printer to most of the high-end pre-press imagers.

Lastly, Adobe is developing its portable document format (pdf) into a pre-press wrapper which will probably become the standard method by which digital artwork travels from the studio to the printing press.

InDesign's interface will be familiar to Photoshop and Illustrator users. There is a main tool palette with keyboard shortcuts consistent with Illustrator and Photoshop. The layers palette works in just the same way, allowing you to rearrange layer order, lock layers and turn them on and off. There is also an XPress-style library of drag and drop frames, vector and bitmap graphics.

The navigator palette provides a quickly accessible method of panning and zooming and you can open several views on one document.

Like Quark XPress, InDesign uses frames to hold content. Unlike XPress, the frame doesn't define the content. In other words a frame can contain either text or a picture - you just press Ctrl & D and select what you want to go in it. InDesign frames can be nested and



YOU CAN EASILY CREATE CLIPPING PATHS IN INDESIGN AND GOOD CONTROL IS PROVIDED FOR TEXT WRAPPING



FOUR VIEWS OF THE SAME DOCUMENT. LAYERS CAN BE TOGGLED ON AND OFF, LOCKED AND REARRANGED, JUST LIKE ILLUSTRATOR AND PHOTOSHOP

compounded and elements remain editable. So it's possible, for

example, to compound two frames so that one punches a hole in the other. It is also possible to import Illustrator and Photoshop files, so you can drag an image from

either onto an InDesign document.

In its early days digital typography did not have a good reputation. XPress improved things a lot and InDesign goes even further, providing typographical exactitude that matches hot metal and photomechanical technologies that preceded it.

At the core is Adobe's multi-line Composer, which achieves superior justified text by evaluating not just single lines of text, but looking up and down a column to assess the impact of changes in word and letter spacing. The result is that typical problems, such as very tightly spaced lines followed by very loose ones, are eliminated. 'Optical Margin alignment' automatically outsets punctuation marks so that the edges of justified columns appear cleanly aligned.

One of the obstacles to widespread adoption of InDesign is the legacy of XPress documents. Quark users will not be eager to migrate unless they can be

sure they can continue to edit and update their old files. Consequently Adobe has put considerable effort into ensuring XPress files will import into InDesign with minimum fuss.

Inevitably, there are imperfections. Colour gradients, text on curved paths, compound paths, tinted greyscales, and pictures with clipping paths can all create problems for InDesign. However, none of these are insurmountable. The test is whether InDesign's advantages outweigh the time and cost involved in manually updating Quark documents.

InDesign does have some bad points. For one thing it makes heavy demands on hardware and you'll need a fast machine with plenty of RAM to work at anything above a crawl. Another is that it will only print to a PostScript printer, though given the availability of software PostScript rips this isn't insurmountable.

PCW DETAILS



Price £469 (£399 ex VAT)

Contact Adobe 020 8606 4001

www.adobe.com

Good points Flexible, powerful typography and layout tools

Bad points Power and memory hungry, PostScript printers only

Conclusion A very worthy contender to XPress' throne



Quark XPress 4.1

A hasty bug fix to counter opposition, but a **true upgrade Xpress 5.0** will appear later this year.

For about a decade there has been only one choice of page layout software for professional designers – Quark XPress.

Adobe InDesign poses a serious threat to XPress and Quark knows it. Its first response was to try and buy Adobe and having been unsuccessful it's now concentrating on improving XPress in order to maintain a dominant position.

Quark has just released version 4.1 of XPress and we managed to get one of the first evaluation copies. The last major upgrade, from 3.32 to 4, was in October 1997. Version 4.1 is just a staging post on the way to XPress 5.0, which Quark says will ship late in 2000.

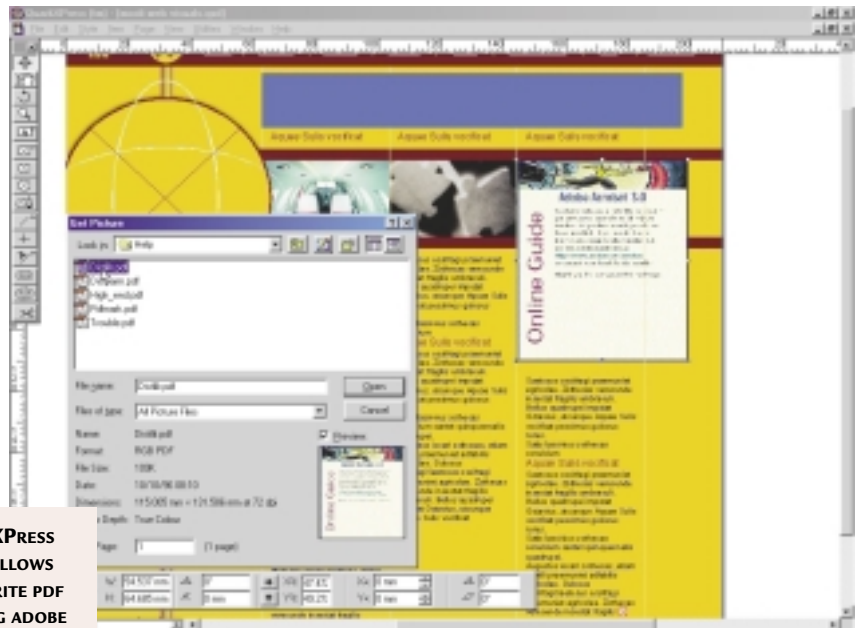
New features are thin on the ground, what has been included is mostly in the form of Xtensions. These include Quarklink – a web-based updater, HTML import and export filters, a pdf import filter, superstep and repeat and Scissors.

Quarklink is currently little more than a pre-configured mini-browser. The headlines palette displays news and updates about Quark and third-party Xtensions. A submenu, which Quark will be able to update, lets you access Quark tech support web pages and send email. Future versions will allow software updates, but there's no mention of the

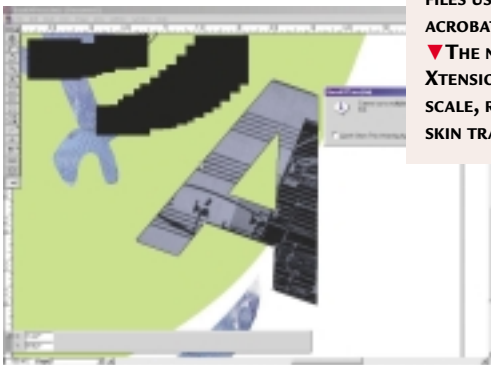
page you want to import. This is limited to version 3 and earlier, so if you're producing pdfs using version 4 you'll need to save them in version 3 format if you want to put them on XPress pages.

You can now also write pdfs directly from within XPress. The software doesn't write pdfs by itself (this will be a feature of 5.0) but uses Adobe Acrobat Distiller. You will therefore need to have either Acrobat Distiller 3.0 or 4.0 installed to be able to export pdfs. As the filter works

The rest is mostly free third-party extensions of varying quality and bug fixes. Updated pictures now import with updated clipping paths rather than the existing one as used to happen. Also you're no longer prompted to save when you've done nothing other than print. This latest version is more stable and you'll no longer experience a crash if you try to change character styles in the character attributes dialog, when you update a tif file with non-white areas



▶ **QUARK XPRESS 4.1 NOW ALLOWS YOU TO WRITE PDF FILES USING ADOBE ADOBE ACROBAT DISTILLER**
 ▼ **THE NEW XTENSIONS ALLOW SCALE, ROTATE AND SKIN TRANSFORMS**



promised conflict resolver which was intended to offer fixes for bugs caused by software conflicts.

Support for Acrobat pdf comes in two forms. The first is an import filter which lets you place pdfs on the page like any other graphic – you create a picture box, press Ctrl & E and select the pdf. Obviously this only works with single pages, with multi-page documents you can specify the

with both 3.0 and 4.0, you won't necessarily have to upgrade to the latest version. One very useful option is the ability to create hyperlinks

from lists and indexes. You can also nominate a specific list to be used for the creation of bookmarks.

HTML export, said Quark, 'is not intended to be comprehensive'. For that, you'll have to wait until version 5, though there is of course avenue.quark – which converts XPress content into XML format. In the meantime what you're looking at is the export of XPress text into html format and vice versa.

The two remaining Xtensions worthy of note are superstep and repeat, that add teeth to the existing command by allowing scale rotate and skew transforms, and scissors, which provides a new tool for slicing up bezier paths.

clipping to an eps, or when copying and pasting text between documents.

Version 5.0 will deliver vastly improved table creation and editing, layers, the ability to include fonts in collect for output and a compositing engine that performs multi-line analysis.

PCW DETAILS



Price £816.62 (£695 ex VAT)
 Passport – £1,032.83 (£879 ex VAT)

Contact Quark 01483 445566
www.quark.com

Good points Well-established, third-party Xtensions, multi-language support in Passport version

Bad points Disappointing upgrade with little of consequence added

Conclusion Upgrade for bug fixes, not new features

Corel Ventura 8

Good for handling **long documents and varying column widths**, but falls behind on **typographics**.

In the late 1980s Ventura Publisher was one of a number of layout applications that capitalised on Windows to provide wysiwyg page layout for specialist publishing applications. Ease of use wasn't high on the list of priorities because producing these publications by conventional means (using embedded codes to format text and layout) was never easy and the mere fact that you could see the results on screen was a big step forward.

Ventura developed and built on its reputation for being able to handle long documents well. Publishers of technical manuals, legal documents, and reference books liked it because it coped with multi-part documents easily, enabled several authors to work co-operatively on one publication, and provided tools for automatic referencing and tables of contents.

Since it bought Ventura in 1993, Corel has made a fine job of maintaining it. Successive releases have strengthened and added to its array of long document publishing features. Corel has also tried to integrate Ventura with Draw and PhotoPaint.

But despite efforts to make it more accessible, Ventura isn't the package you'd choose for magazine or newsletter production – it's too complicated. On the other hand, if you regularly produce documents that run to several hundred pages, go through several revisions and require collaborative input from many individuals this is the way to do it.

Formatting in Ventura is tag-based. Tags are used to apply formatting styles to each layout element from pages through frames, paragraph and line styles to characters. Ventura's master page styles are also applied via tags.

PCW DETAILS

★★★★

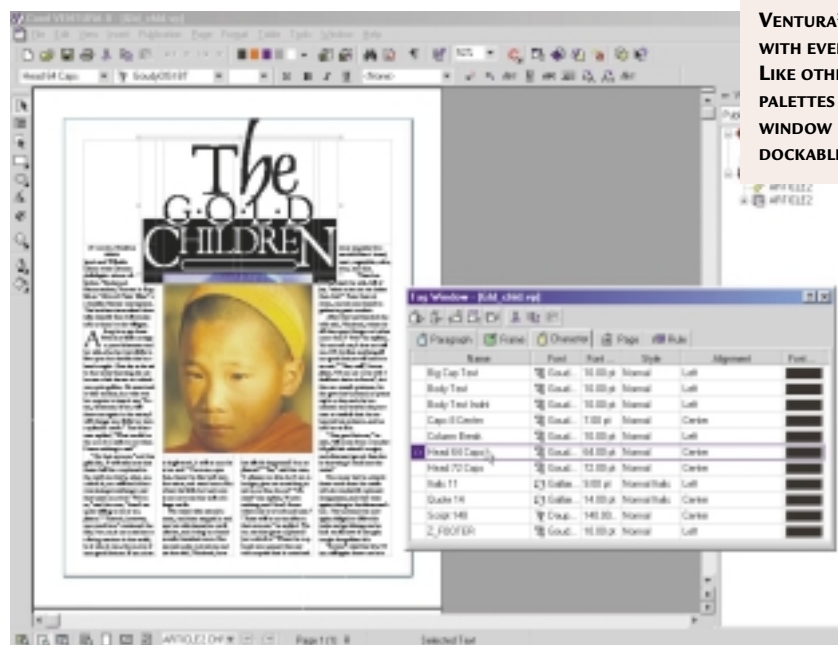
Price £339.57 (£289 ex VAT)

Contact Corel 00161 3728 0826
www.corel.com

Good points Long document features, web features, Corel integration

Bad points Complicated, steep learning curve

Conclusion For long complex, multi-authored projects and existing Corel users



VENTURA'S TAGS WITH EVERYTHING. LIKE OTHER PALETTES THE TAG WINDOW IS DOCKABLE

Page tags provide a very flexible method of setting up master page guides. Firstly, you can define different page tags for left and right-hand pages. You can also set different column widths on the same page. Most packages will only let you split the page into equal columns, but Ventura lets you create, say, an outer column that's narrower than the two inner columns. In most other packages you would have to create three equal columns on the master pages, then drag guides to indicate where you wanted the real columns to begin and end.

In previous versions of Ventura, formatting could only be applied to an individual paragraph by using an override, which resulted in two text modes – now you can apply changes to either specific paragraphs, or the tag itself. It's also now possible to preview changes before applying them. Having altered a paragraph style you can either apply the changes to the existing paragraph tag, or create a new tag based on the updated properties.

Ventura's grid features are less impressive, owing more to illustration than page layout. It's as though they've been grafted on from Draw without a thought for typography requirements.



ARTISTIC TEXT CAN BE CONVERTED TO PATHS AND RESHAPED OR, AS HERE, CONVERTED TO A FRAME INTO WHICH A PICTURE HAS BEEN DROPPED

While it's easy to align elements to the grid, type doesn't so much take a back seat as get left behind in the car park. There is no baseline grid on which to align type.

Ventura provides good typographic effects in the form of artistic text, which can be converted to bezier paths and then node edited. You can also convert artistic text to a frame which can then accommodate text or pictures.

Internet features have been radically enhanced. It's now possible to create hyperlinks to specific chapters and document files. There's support for frames, cascading style sheets, ftp, mailto protocols and image maps. Index entries converted to HTML include links to every mention of that entry in the entire document, rather than just the first entry, as was the case in version 7.

PageMaker 6.5 Plus

If you need to produce catalogues that are likely to undergo **layout changes**, this could be for you.

It's hard to believe that PageMaker once competed with XPress for domination of the professional publishing market. When Adobe merged with Aldus in 1994 the battle was already lost and Adobe repositioned it as a DTP solution for office professionals – people producing reports, flyers and catalogues.

Version 6.5 introduced powerful new features including document-wide layers, text and graphic frames, import of native Illustrator files, support for Acrobat 3 and web publishing features.

The Plus version adds content in the form of templates, illustrations in Illustrator format and 300 high-resolution photos. A template and picture palette gives easy access to the material and a toolbar provides shortcuts to commonly used features.

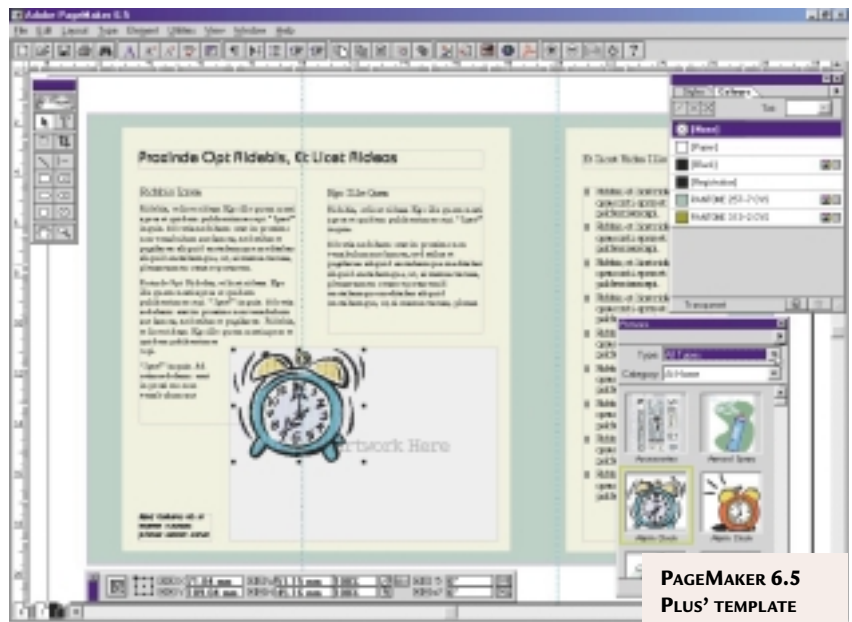
6.5 Plus ships with Photoshop 5.0LE, Acrobat Distiller and the Type-on-call CD with 220 free fonts. The redesigned interface makes it look a lot like Illustrator and Photoshop. Most features are accessed through interactive tabbed palettes.

A fairly unique feature is automatic layout adjustment, which also appears in InDesign. If you need to change the size or format of your document this useful feature rearranges all the page elements so that they fit the new layout.

This works better in some situations than others, depending on the original positioning of the elements and the degree of layout change required. PageMaker repositions and resizes objects with reference to margin, column and ruler guides.

Many of PageMaker's newer features are implemented as

**THE DROP CAP
PLUG-IN PRODUCES
LESS THAN INSPIRING
RESULTS**



**PAGEMAKER 6.5
PLUS' TEMPLATE
COLLECTION IS
NOTHING TO WRITE
HOME ABOUT, BUT
THE PICTURE
PALETTE IS A
WELCOME ADDITION**

plug-ins, though the quality of these is variable. The drop cap plug-in, for example, displays a simple dialog in which you enter the number of lines and click an apply button. This plug-in failed on every occasion to produce a decent drop cap that didn't require considerable post-plug-in editing to make it presentable.

One useful plug-in is the grid manager. This lets you set page margins and column grids individually for left and right pages and set up a baseline grid to which text and graphic elements can be aligned. Build Booklet is an imposition manager which allows you to arrange multiple spreads on a single sheet for commercial printing, re-order spreads, add and remove pages and even compensate for creep – where margins

move outwards at the front and back of large publications due to the bulk of the paper.

The Save for Service Provider runs a pre-flight to check for missing fonts, broken links to graphics and correct printing inks before saving all the necessary files to disk.

Adobe has included two converter applets for MS Publisher (97 and 98) and Quark XPress files. A certain

amount of tidying up will be required, but the simple XPress and Publisher documents we

tried came across with few problems.

Support for web publishing is good. The new hyperlinks palette makes creation and testing of links a quick and simple process. An enhanced HTML export plug-in allows you to choose pages for export and automatically downsamples graphics to 72dpi and converts them to gif or jpeg format.

PageMaker will never match Publisher 2000 for ease of use, but in combination with Photoshop LE and Acrobat, PageMaker 6.5 Plus provides a powerful suite of publishing tools both for paper-based publications and the web.

PCW DETAILS

★★★★

Contact Adobe 020 8606 4001
www.Adobe.com

Price £351.33 (£299 ex VAT)

Good points Auto layout adjustment, web features

Bad points Poor-quality content

Conclusion A halfway house between pro and home packages

MS Publisher 2000

If your life depended on producing a publication in 10 minutes, this is the package to choose.

Publisher is part of Microsoft's Office 2000 suite, though you can also buy it as a standalone application, or twinned with PictureIt 2000, Microsoft's image-editing application. This latest release both adds relevant new features and builds on Publisher's reputation for ease of use.

The first thing you see when Publisher launches is the catalogue which displays big template thumbnails. You can

choose templates based on wizards or design, and there are also blank ones.

New quick publication wizards help you produce single-page poster-style documents almost instantly; a new catalogues section has been added and 10 new master sets expand the range.

Having chosen a basic template, the wizard helps you select a colour scheme, column layout, print options and so on. You can use the wizard to modify the design, or to add elements – for example a calendar, or customer order form.

New touches are a measurements palette, that provides fast access to text properties like tracking, scaling, and line spacing, and the ability to flip pictures.

Facilities for commercial printing have been greatly improved with support for CMYK and Pantone spot colours, automatic and

manual trapping control and a 'pack and go' feature which collects all the elements and will copy them to several disks for delivery to an output bureau. There's also a publication checker which, though not up to the standard of professional pre-flighting, will highlight any obvious design and print problems.

The web-publishing wizard now includes more design templates, backgrounds and animated gifs.

PCW DETAILS

★★★★

Price £78.72 (£67 ex VAT)

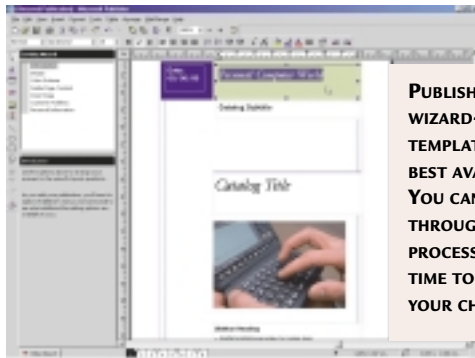
Contact 0345 002 200

www.microsoft.com

Good points Simple interface, great templates, wizard web tools

Bad points Depressing absence of competition

Conclusion Ease of use and excellent templates make this one a winner



PUBLISHER 2000'S WIZARD-BASED TEMPLATES ARE THE BEST AVAILABLE. YOU CAN GO BACK THROUGH THE PROCESS AT ANY TIME TO CHANGE YOUR CHOICES

GSP Power Publisher

If you're a **small business user**, this is an easy way to produce professional stationery and flyers.

In a previous life Power Publisher was GSP Pressworks, then GSP updated it and incorporated it in a publishing suite including Designworks 3.5 – a vector draw application, a photo editor, address book and clip art collection collectively called Power Publisher 3.

Like most publishing packages aimed at the home and small-business user, Pressworks makes extensive use of wizard-based templates (called page pilots) so that lack of design know-how is less of a problem than it would be if you had to start from scratch.

The page pilots are not as good as MS Publisher's wizards, but they do offer a choice of different layouts, font schemes and colours.

What's more, the templates on which they are based provide a reasonably wide range of appropriate material. The business stationery page pilots, for

example, include basic templates for letterheads, business cards, compliments slips, fax headers and so on.

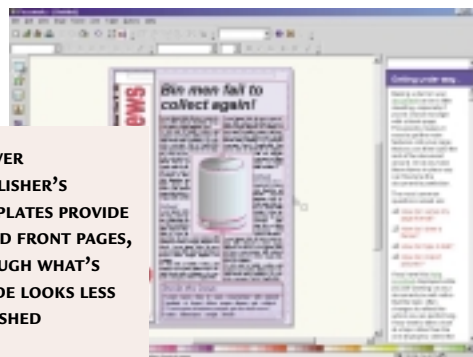
There is a fair collection of conventional templates for everything from Avery labels to CD inlay cards.

Having got past the template stage further guidance is provided by the help assistant – a context-sensitive window to the right of the editing area – which provides information relevant to the particular tool or command you select.

Editing tools are reasonably versatile, frames can contain either text or pictures that can be grouped together, rotated and locked in position on the page.

Powertext allows you to apply a range of text effects including 3D extrusions and, like PagePlus, Pressworks has a built-in photo-editing applet for basic image editing, but no special effects filters.

A recent upgrade to version 3.04 fixes a number of bugs, including improved handling of powertext and a fix so that Pressworks runs on Windows NT with the Year 2000 patch installed.



POWER PUBLISHER'S TEMPLATES PROVIDE GOOD FRONT PAGES, THOUGH WHAT'S INSIDE LOOKS LESS POLISHED

PCW DETAILS

★★★

Price £49.95 (£42.50 ex VAT)

Contact 01480 496 575

www.gspltd.co.uk

Good points Templates, help assistant

Bad points Inflexible, limited

Conclusion Falls well short of Publisher

Serif PagePlus 5.0

Clever editing for **logos and good proofing** are combined with a very a low price, but little else.

Serif PagePlus 5 is a budget DTP application in need of a facelift. The Professional edition includes lots of power features like spot and process colour separations, trapping control and table and logo design modules. On its release over two years ago, this kind of control was unheard of in packages for the non-professional user, but now they are commonplace.

Serif's interface also looks jaded. It is very Office-like, with a standard, context-sensitive grey toolbar along the top and another down the side.

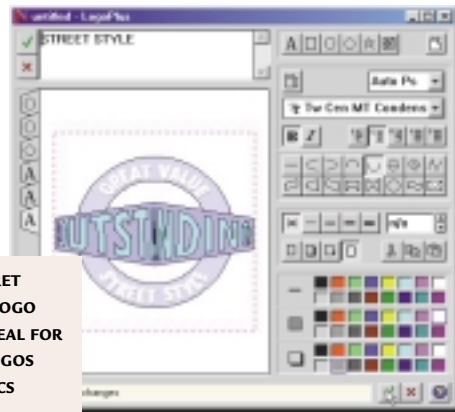
PagePlus uses basic templates in combination with a wizard to build the bare bones of a publication. The wizard adds little, other than allowing you to choose from a limited number of styles and colour schemes and placing your company details at appropriate places.

The template collection too leaves a lot to be desired. While you might be prepared to use the party and domestic

stuff, the business templates are woefully inadequate.

The saving grace is LogoPlus, a perfect little applet which provides a layered editing window with a set of tools for creating logos and other graphics. There's a decent library of logos, stamps and flashes that you can edit and the tools and interface strike the right balance between power, flexibility and ease of use.

Another area in which Serif started ahead of the competition is proofing features. PagePlus includes spell checking, layout checking and proof-reading wizards. Until it gets an upgrade, though, newer applications like Publisher have better features and are easier to use.



SERIF'S SECRET WEAPON – LOGO PLUS – IS IDEAL FOR CREATING LOGOS AND GRAPHICS ON-THE-FLY

PCW DETAILS



Price £48.52 (£39 ex VAT)

Contact Serif 01625 539 494
www.serif.com

Good points Logo Plus, proofing

Bad points Templates, wizards, interface

Conclusion Lowest price, lowest quality

PrintMaster 8.0

A neat, well thought-out package with **loads of content**, let down only by its poor templates.

PrintMaster Home Premier 8.0 is comprehensive, consisting of no fewer than 11 CDs, nine of which contain templates, clip art, fonts and other content. As well as the PrintMaster application you get Serif Drawplus 3, Broderbund's Photo Organizer 1.4 and an address book and event reminder.

Printmaster is quite good for creating quick, simple projects. You start at the 'hub' which offers three

options – ready-made documents, 'with help' guided projects and 'brand new' blank templates.

The 'with help' projects are wizard-driven, but limited in scope. The newsletter is typical: first you choose from business, educational or personal.

Regardless of which you choose, you are next given three options – classical, contemporary and whimsical, and then the number of pages and that's it.

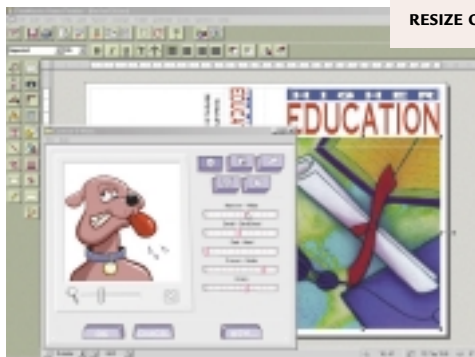
The only difference between the three initial categories is content. The business newsletter is for a travel agent, the personal one is about gardening, but there's no evidence that any thought has gone into making the design appropriate, and renders them virtually useless for business.

The interface is well designed and features big tool buttons with hint panels to tell you what they are and an uncluttered editing window. In addition

to the usual text and graphic tools there are some interesting diversions. The best of these is Cartoon-o-matic, which lets you edit cartoon characters by means of sliders that control the size and shape of limbs and facial features.

Also included is PhotoWorkshop, which allows you to retouch and apply filter effects to bitmap images and includes red-eye removal, colour balancing and basic cut-out tools.

CARTOON-O-MATIC IS A NIFTY LITTLE TOOL WHICH LETS YOU EDIT AND RESIZE CARTOONS



PCW DETAILS



Price £70.45 (£59.99 ex VAT)

Contact The Learning Company
01444 246 333

www.mindscapeuk.com

Good points Loads of content, clean and modern interface, Cartoon-o-matic

Bad points Thoughtless template design

Conclusion The Official Opposition to MS Publisher 2000



Electronic publishing

If you plan to build **your own website**, ensure your DTP package has the tools to let you do it.

If you want to create a website, the best way is to use a dedicated HTML authoring tool such as Macromedia's Dreamweaver or PageMill.

For home users, having web authoring tools built into a desktop publishing suite means you don't have to pay for and learn to use another package which essentially does the same thing.

The four packages aimed at the home and small-business user all provide the tools and guidance necessary to produce simple, but attractive websites. MS Publisher 2000 strikes a good balance between ease of use and creative flexibility and now has a substantial library of backgrounds and animated gifs, though this kind of content is freely available all over the web.

Both Pressworks and PagePlus use a similar wizard approach to Publisher, but

the results are less polished. Page Plus has very good facilities for producing animated gifs and scrolling banners and PressWorks has attractively designed templates, but is let down by poor editing tools.

For professionals, developers are including basic web functionality, such as the ability to include hypertext links combined with an HTML export filter.

Ventura 8 supports such HTML features as frames, image maps, cascading style sheets, ftp, news and mailto protocols. Index entries are automatically linked to every occurrence of the word within the document – an improvement on version 7 which only linked to the first occurrence.

PageMaker 6.5 has a new hyperlinks palette and plug-ins provide HTML import and export features. The export

filter works on both text 'stories' and complete pages. PageMaker converts images to gif or jpeg when you export to HTML or create a pdf and you can also drag page elements from PageMaker onto PageMill, Adobe's web authoring package.

XPress 4.1 ships with Quark's new HTML export filter, the beta of which has been available on the Quark website for some time. This filter is limited to import and export of text only, you can't turn an XPress page or document into HTML.

Instead, Quark has opted for a much more ambitious and intelligent way of automatically repurposing content for the web, Avenue Quark. This provides a route for moving content from XPress pages into XML (Extensible markup language) format. XML uses labels to describe data, for example.

Beginners' guide to design

Want your publication to make **a good impression**? Follow our guidelines and you'll be successful.

By following a few simple guidelines you can make your publications more presentable, inviting and professional. As well as providing a more enjoyable publication, following basic layout principles also makes your job much easier.

Use a column grid. Split your page into two, three or four columns and align all page elements to them. Try to keep body copy text within the column measure, though you can run headlines across several columns for impact.

Pick two typefaces – one for body text and another for headings – and stick to them. One convention is to use a serif face for body and sans serif for headings.

Don't be tempted to change the point size to get text to fit your layout. Once you start down this road the integrity of your design will start to crumble. The same goes for leading (line spacing) and horizontal scaling. You can get away with a little bit of tracking to save the odd line or two.

If your text doesn't fit you have several options, depending on whether you have too much or too little. You can

cut it, write more, add or remove other elements. Look to pictures, pull quotes, cross heads, and graphics to adjust the length of the layout until everything fits. Avoid overuse of bold and italic and never use all capitals for emphasis.

Use style sheets – they make life easier and ensure consistency. Define style sheets for every typographical element from body text and headlines to captions, intros, pull quotes and crossheads.

Break up long swathes of text with pictures, crossheads (subheadings in the body text) pull quotes (short 'sound-bites' from the body text set in a larger typesize between quote marks), box-outs (short pieces on a related theme) and anything else you can find.

Don't fill every square inch of the page. Leave adequate space between columns and around the elements on the page. Large areas of white space help to emphasise the individual parts of the page and give the layout balance. Either leave plenty of space around heading text, or leave an outside column blank.

Steal ideas from other publications. Take a look at how PCW is designed.

Other good sources of layout ideas are Sunday supplements, coffee table books, and just about any magazine.

Colour, used intelligently, can transform your publications. As with fonts, it pays to decide on a scheme using one or two base colours and build on that with tints. Colour can be used to provide visual clues as to content, but only if you use it consistently.

Solid colour can be used effectively on large display type, but avoid using it on body text. If you're using dark colours you can set crossheads, or pull quotes in white on a panel of the dark colour. You can use a tint, 40 per cent or so, to produce a box-out panel with black text.

Proofread your publication prior to printing to avoid embarrassing errors. Get a fresh pair of eyes to check it too. Other than typographical errors, check for widows and orphans (single words or phrases at the end of a paragraph, especially at the top of a new column, or the first line of a new paragraph at the bottom of a column), mis-alignments, pictures, incorrect page numbers and dates and overflowed text boxes.

Table of features



PRODUCT	ADOBE INDESIGN 1.0	QUARK XPRESS 4.1	COREL VENTURA 8.0	PAGEMAKER 6.5 PLUS
MANUFACTURER	ADOBE	QUARK	COREL	ADOBE
Telephone	020 8606 4001	01483 455 566	00161 3728 0826	020 8606 4001
Web	www.adobe.com	www.quark.com	www.corel.com	www.adobe.com
Platforms	Win95/98/NT, MacOs	Win95/98/NT, MacOs	Win95/98/NT	Win95/98/NT, MacOs
Street price (ex VAT)	£469 (£399)	£816.62. (£695) Passport £879 (£1,032.83)	£339.57 (£289)	£351.33 (£299)
Style sheets	✓	✓	✓	✓
Colour management	✓	✓	✓	✓
Plug-ins	✓	✓	Quark Xtensions for bitmap effects	✓
Colour separation	✓	✓	✓	✓
Scripting	✓	✗	✓	✓
Bezier tools	✓	✓	✓	✗
Clipping paths	✓	✓	✗	✗
Text on a path	✓	✓	✓	✗
Convert text to path	✓	✓	✓	✗
Auto table of contents	✗	✓	✓	✓
Auto indexing	✗	✓	✓	✓
Multiple users	✗	✓	✓	✗
Tables	✓	✗	✓	✓
Preflight	✓	✗	✓	✓
Collect for output	✓	✓	✓	✓
Layers	✓	✗	✗	✓
PDF	✓	✓ Needs Distiller	✗	✓ Distiller supplied
Web features	PDF creation	HTML text import and export	HTML export, image maps, Java	HTML import and export export animation and sound clips

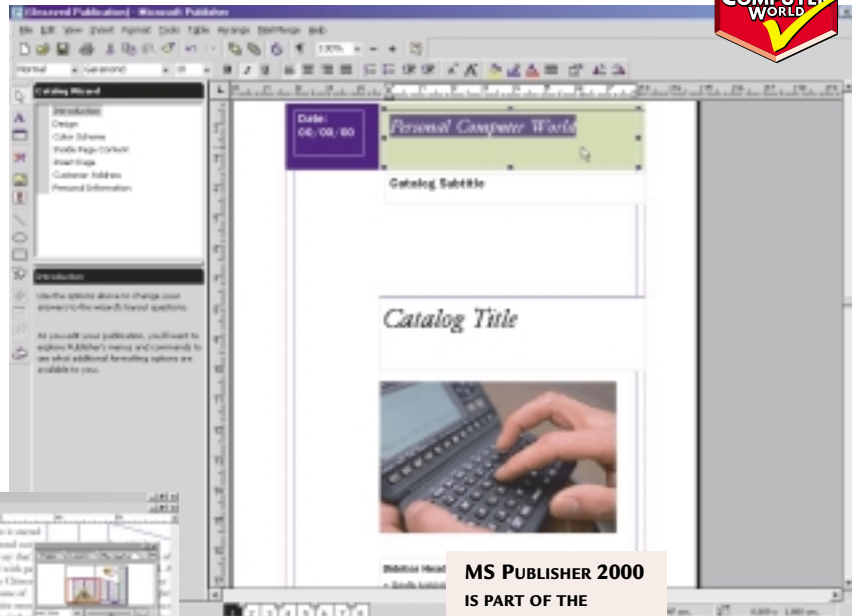


PRODUCT	MS PUBLISHER 2000	GSP POWER PUBLISHER	SERIF PAGEPLUS 5.0	PRINTMASTER HOME PREMIER
MANUFACTURER	MICROSOFT	GSP	SERIF	MINDSCAPE
Telephone	0345 002 200	01480 496 575	01625 539 494	01444 246 333
Web	www.microsoft.com	www.gspitd.com	www.serif.com	www.mindscapeuk.com
Platforms	Win95/98/NT,	Win95/98/NT	Win95/98/NT	Win95/98/NT
Street price (inc VAT)	£78.72 (£67)	£49.95 (£42.50)	£48.52 (£39)	£70.45 (£59.99)
Style sheets	✓	✓	✓	✗
Colour management	✓	✗	✗	✗
Plug-ins	✗	✗	✗	✗
Colour separation	✗	✓	✓	✗
Scripting	✗	✗	✗	✗
Bezier tools	✗	✗	✗	✗
Clipping paths	✗	✗	✗	✗
Text on a path	✗	✗	✗	✗
Convert text to path	✗	✗	✗	✗
Auto table of contents	✗	✗	✓	✗
Auto indexing	✗	✗	✓	✗
Multiple users	✗	✗	✗	✗
Tables	✓	✓	✓	✓
Preflight	✓	✗	✗	✗
Collect for output	✓	✗	✗	✗
Layers	✗	✗	✗	✗
PDF	✗	✗	✗	✗
Web features	Web wizard, HTML	Web pilot, HTML export	Web, scrolling banner, animated gif & MS Web publishing wizards	Web templates, wizard and content, HTML export

Editor's Choice

If you are looking for an easy-to-use, inexpensive package for producing newsletters, fliers, catalogues or business stationery, the clear **Editor's Choice** is Microsoft Publisher 2000. Both novices and experienced users rely on templates to shortcut the often time-consuming and difficult process of designing from scratch. Publisher has some of the best templates included in either the home or professional packages we've reviewed.

The standard of guidance provided by Publisher's wizards is also of a superior standard. Firstly, they deliver real variety, providing much more than



MS PUBLISHER 2000 IS PART OF THE OFFICE 2000 SUITE. ITS REPUTATION IS WELL DESERVED



ADOBE INDESIGN'S INTERFACE WILL BE REASSURINGLY FAMILIAR TO PHOTOSHOP AND ILLUSTRATOR USERS

mere cosmetic changes to the base templates. What's more, they remain active so you can go back at any time and amend your choices.

The publication checker also helps to reduce the potential for nasty shocks when you get your finished product back from the printer and the ability to translate print content into web material is a bonus.

Finally, Microsoft has, and will most likely continue to support Publisher in the future, so regular upgrades are assured.

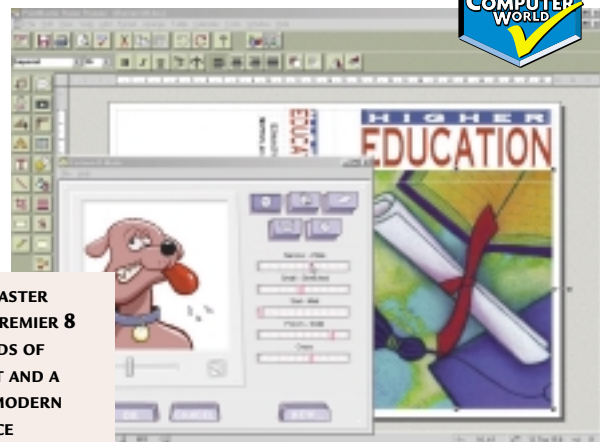
For professionals, Adobe InDesign looks an even more attractive bet and wins the first of our **Highly Commended** awards. In terms of features, InDesign is far in advance of anything the competition has, or is likely to have in the near future. The lengthy list includes document-wide layers, scripting, unlimited undo, five to 4,000

percent magnification, 18ft wide spreads, limitless pasteboard, native editable import from Photoshop and Illustrator, nested editable frames, plus advanced typographic control. Adobe's development of pdf as a prepress output format further strengthens the case for InDesign, which can export directly to pdf format. PostScript Extreme, which has PostScript and pdf at its core, makes the job of preparing publications for output easier, less prone to error and more flexible, while at the same time eliminating the need to rework them for different media. In other words you can send the same document for output to a composite digital printer, commercial four-colour press and the web with no additional formatting. One of the big

barriers to tempting Quark users over to InDesign is the issue of file compatibility, but Adobe has paid close attention to this and most files import into InDesign with the minimum of fuss.

Finally, also recommended is Mindscape's PrintMaster Home Premier 8. This is the first look we've had at the package and its fresh approach combined with a wealth of content provides a welcome addition.

A well designed interface with big tool buttons and hint panels helps first-time users to easily get to grips with the package. The innovative Cartoon-o-matic, with its editable characters, only adds to the fun.



PRINTMASTER HOME PREMIER 8 HAS LOADS OF CONTENT AND A CLEAN, MODERN INTERFACE





hands on

contents

Let's face it, PC users are being spoiled by the sheer range of quality hardware and software available, coupled with tumbling prices.

You can now get Abit's BP6 motherboard stuffed with two 500MHz Celerons for just over £300 – a powerful combination when matched with the release of the first consumer-friendly OS from Microsoft to support multi-processor systems.

As ever, *Hands On* is the best place to turn to for in-depth technical advice on how to get the most from these new technologies. In our **Workshop** [p230], Terence Green has the low-down on Windows 2000 – from whether or not to upgrade, to an in-depth look at the OS' features.

Another area that has seen rapid development is digital cameras. In **Hardware** [p254], Gordon Laing argues it's time to ditch the APS camera for an all digital solution.

And for those not tempted by Windows 2000, Roger Gann explains in **Networks** [p267] how to get PCs sharing the same dial-up Internet connection using the Internet Connection Sharing in Windows 98 SE.

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Microsoft's latest operating system is here, but Terence Green asks if it's worth upgrading



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Stall or install?

As Microsoft's latest OS finally hoves into view, Terence Green asks if it's worth taking the plunge.

Those thinking of upgrading to Windows 2000 first have to ask themselves if

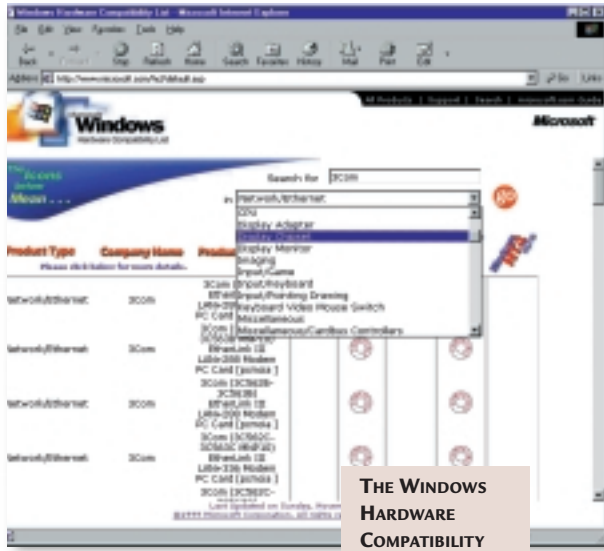
they really need it. And unfortunately, there's no easy answer. Windows 2000 looks like Windows 98, but it isn't Windows 98. It feels like Windows NT, but it isn't, despite the splash screen that says 'built on NT Technology', the 'New Technology' of Windows NT.

First, let's take a look at some terminology. Windows 2000 is a family name. There's a desktop client, Windows 2000 Professional, which resembles Windows 98, but is really the next version of Windows NT4 Workstation. There are also three server versions, of which Windows 2000 Server is the entry-level product. We'll use 'Windows 2000' to refer to features that are common to the whole family, 'Windows 2000 Professional' for the desktop client only, and 'Windows 2000 Server' for server issues.

Windows 2000 attempts to square the circle that Windows NT couldn't, because - although it was more reliable than Windows 95/98 - it didn't support as many peripherals and applications. A properly configured Windows 2000 will be more stable than Windows 98 by design, but this OS nirvana relies on the careful selection and configuration of hardware and software.

Users may want to hang back during the days following the initial release, because they could find that their favourite peripherals - display adaptors, printers, scanners - are not fully supported. Vendors must wait until Windows 2000 is committed to shrink-wrap before they can finalise their drivers, which then need to be tested by Microsoft to carry the approved logo.

There are a host of other reasons to wait a while before deploying Windows 2000, not least because Microsoft's version 1.0 releases are by tradition the start of a long period of refinement.

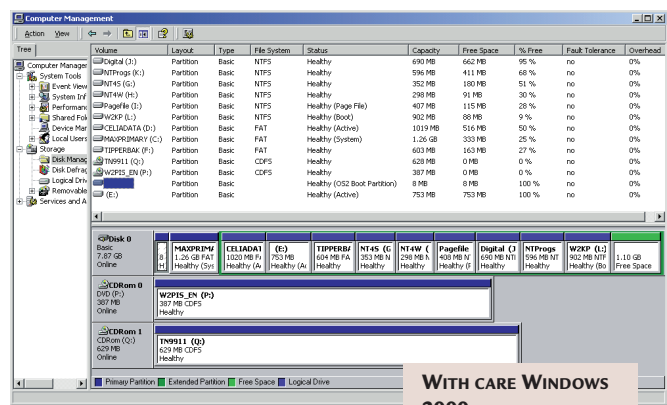


THE WINDOWS HARDWARE COMPATIBILITY LIST WILL HELP YOU PLAN AHEAD

Pros and cons

The real question you need to ask is not 'what can Windows 2000 do for me?' but 'have I got what it takes?' We'll come to minimum hardware in a moment, but more importantly your hardware must be compatible. A single piece of hardware, a sound card say, which Windows 2000 doesn't like could cause untold sorrow.

The ACPI (Advanced Configuration and Power Interface), which allows



WITH CARE WINDOWS 2000 CAN BE MADE TO CO-EXIST WITH MULTIPLE OSs

Windows 2000 rather than your BIOS to control power management and plug and play peripherals, is sure to become another bugbear. Your PC may need a BIOS upgrade for ACPI support, but even then Windows 2000 won't enable it unless every device and driver also supports ACPI. If ACPI is not

installed Windows 2000 may show an APM tab in the Control Panel Power Management applet, but BIOS-enabled Advanced Power Management is not officially supported by Windows 2000.

Start your preparation by visiting the Windows 2000 Hardware Compatibility List (HCL) at www.microsoft.com/hcl/default.asp. It's the definitive word on Windows 2000 compatibility and has links to recent driver updates. Any device that needs a specific driver may take a while to appear on the HCL, as it needs to be tested by Microsoft to be certified and

digitally signed. Microsoft devised this system because dodgy device drivers have been one of the main causes of system problems in Windows NT. Windows 2000 will issue a warning if you install an unsigned driver, but won't prevent you from continuing. Adventurous types will click on, but think carefully if your business depends on this system.

Now would also be a good time to read up on the Safe Mode boot options and the recovery console and, if you don't already have a tape backup, to set up this system.

Check your software

Windows 95/98 or Windows NT applications may not run on Windows 2000. Be especially careful of those with '2000' in the name. It's a marketing device, not a guarantee of Windows 2000 compatibility. The

only guarantee is if the Windows 2000 logo appears on the box and it is listed on the Windows 2000 Product Compatibility page at www.microsoft.com/windows/

Software issues

The most common reason to set up a dual-boot system (booting both Windows 2000 and an earlier Windows) is to run games that don't run on Windows 2000. Mostly this means games that want direct access to the hardware which, for reasons of stability, neither Windows 2000 nor Windows NT allow. Windows 2000 will be much less of a problem in this respect, because it includes Microsoft's DirectX 7.0.

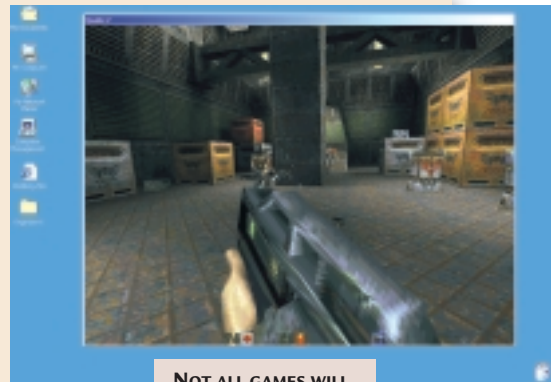
DirectX enables games authors to write to an API which gives them the speed they need without compromising the system by enabling direct access to hardware. But for DirectX to work games, audio, and video peripherals must have

suitable device drivers. Certified drivers won't launch until after Windows 2000 ships. So, many games currently have problems or don't run at all. This situation will clear up but it will take a bit of time. The good news is that Windows Driver Model (WDM) drivers, that work on both Windows 98 and Windows 2000, will mean quicker driver updates.

But WDM is only useful for some multimedia devices (DVD and audio for example), it can't be used for video display drivers.

Because Windows NT only supports a poor software emulation of DirectX 3, many people run Windows NT and Windows 95/98 in a dual-boot configuration.

If you've done this and installed both operating systems on a single drive partition on the C: drive, a Windows 2000 upgrade of the Windows 95/98 operating system will fail. This happens because the Windows NT and 95/98 systems share C:\Program Files and the Windows 2000 upgrade deletes unneeded Windows 95/98 files. Because these files are in a directory which Windows NT shares, the upgrade is aborted. You must remove Windows NT before you can install Windows 2000. You won't be able to move the



NOT ALL GAMES WILL RUN FROM DAY ONE OF WINDOWS 2000'S RELEASE BUT DON'T WORRY, DRIVERS ARE ON THE WAY

Windows NT operating system, even with utilities such as PartitionMagic. You could use it to repartition the drive into two or more partitions but it's best to start again, reinstalling everything after first backing up your data.



server/Deploy/Compatible/default.asp.

Next, check whether you have the resources to run Windows 2000 – at least a 166MHz Pentium CPU, 2GB of free hard disk space, mouse, keyboard and VGA display. You'll also need a CD drive unless you install from a network. More hard disk space will come in handy if you want to install

Some people will insist they run it on lesser hardware but remember, you do have a life away from the keyboard. For real work, a fast CPU (Intel Pentium II or III or AMD Athlon) is best and unlike Windows 98, Windows 2000 exploits multiple processors; up to two for Windows 2000 Professional and four for Windows 2000 Server.

applications as well. Windows 2000 and its swap file takes up the better part of a gigabyte. If you want to run those applications, you'll need to double the minimum RAM requirements of 32MB for Windows 2000 Professional and 64MB for Windows 2000 Server. You'll need to double these requirements again for smooth operation.

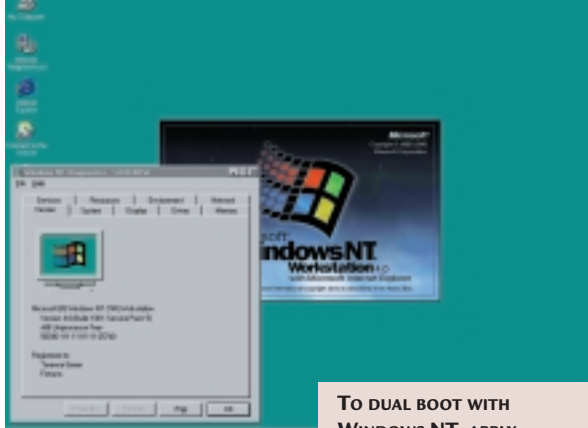
The CPU requirements that Microsoft gives are definitely a minimum.

■ Upgrade options

You've got the hardware, your software checks out. If starting from scratch with a clean install of Windows 2000 only on a new PC, no problem. Windows 2000 can also be used to upgrade 95, 98, or Windows NT. A simple matter you might think, but there are several gotchas, most of which are application-related, but drivers can be an issue too. For example, the upgrade may pop up a warning at the end that some applications have not been upgraded. By then it's too late. You can't reverse.

Always check applications and driver compatibility first and read the manuals! If there are documented problems, consider setting up a dual-boot system. To retain an earlier version of Windows – installed on a disk that is partitioned as a single drive – you must create two or more partitions. Do not install Windows 2000 on the same disk partition, for example, alongside Windows 98 on the C: primary drive. Microsoft does not support this configuration.

Some applications are hardwired to share the C:\Program Files subdirectory



TO DUAL BOOT WITH WINDOWS NT, APPLY SERVICE PACK 4 OR HIGHER BEFORE INSTALLING WINDOWS 2000

and may overwrite another's files. Use PartitionMagic to repartition on-the-fly or do it the long way with backup and restore plus FDISK. Always install Windows 95 before installing Windows 2000, because the Windows 95 setup will overwrite Windows 2000 boot files. Windows 98 can be installed before or after Windows 2000. Consider using three partitions, C: for Windows 95/98, D: for shared data, and E: for Windows 2000. This is because, although Windows 2000 can read FAT, FAT32, and NTFS-formatted drives, Windows 98 can't read NTFS drives.

If it all sounds very complicated, that's because it is, but with careful preparation you can work around many of the gotchas. The end result should be a system that is faster, smoother, and more reliable than Windows 98.

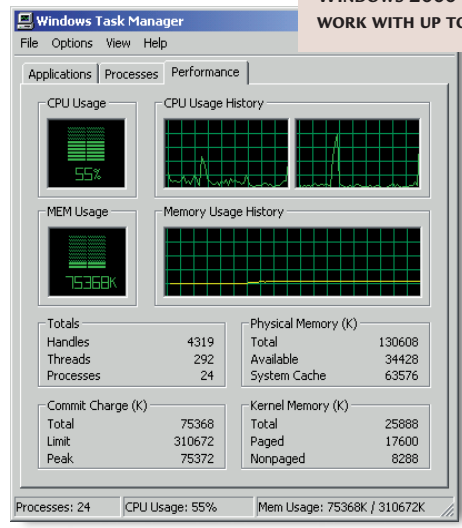
Those looking to upgrade servers need to be a bit more cautious about updating to Windows 2000. It might be relatively safe to evaluate Windows 2000 on a working business desktop, but when it comes to servers you need to be far more careful, especially production servers supporting a number of clients. Windows 2000 raises many issues that you need to consider before installing a new Windows 2000 server or upgrading an existing Windows NT server. Not all of these can be covered here, but we will be looking at them in detail over the coming months. Bear in mind though, that any Windows NT Server except a Microsoft Small Business Server or a Windows 3.51 server running Citrix WinFrame can be upgraded to Windows 2000 Server.

One gotcha you want to be careful to avoid is that Windows 2000 automatically converts any NTFS drives it finds to a new version of NTFS during the install. If a removable drive is not inserted

or otherwise offline during install it will be converted as soon as it comes online. Windows NT4 cannot read the Windows 2000 NTFS format unless it has been upgraded to Service Pack 4. If you plan to configure a PC as a dual-boot system by installing Windows 2000, you must apply SP4 to the NT4 system on it - or NT4 will not be able to read the new NTFS disk. The golden rule is always to apply SP4 to the Windows NT4 system before installing Windows 2000.

Hardware issues are a critical matter for servers. Don't even think of trying a 'suck it and see' approach with a production server. If possible, use a server identical to the production server to test-install Windows 2000 or buy a new server and install Windows 2000 on that. Windows 2000 will quite

WINDOWS 2000 PROFESSIONAL SUPPORTS UP TO TWO PROCESSORS, WHILE WINDOWS 2000 SERVER CAN WORK WITH UP TO FOUR



happily run alongside Windows NT as a member of a workgroup or domain and you won't have to install or implement Active Directory. Once you've become familiar with Windows 2000 you can think about whether you want to introduce Active Directory and how to go about it.

If you decide to buy new hardware to run Windows 2000 Server, you should consider buying from one of Microsoft's established OEM partners. It may cost a little more, (not much these days), but

the OEM will have done the hard work of making sure that the hardware is compatible with Windows 2000. A few extra pounds spent on hardware could save a great deal of wasted time and frustration down the line.

If you take the DIY approach or upgrade an existing server and plan to re-use old components, pay careful attention to the official Hardware Compatibility List. Some components, even relatively popular PCI-based network interface cards (NICs) such as the 3Com Etherlink III and Fast Etherlink III, may not be supported. Numerous other issues related to NICs are listed in the release notes. Don't ignore them, read them!

You'll also find issues with ISDN cards and multiport serial cards. The former may not be supported after upgrading an NT server, the latter can be adversely affected by ACPI power management.

When installing Windows 2000 on a server you should take its support for Plug and Play into account and ensure that any ISA cards that support Plug and

Play are set to auto configure, not manually configured. If you can do without ISA cards altogether so much the better. If you don't know what hardware you have

in your server and don't want to crack it open, you can run a compatibility check from the Windows 2000 CD with the command `D:\i386\winnt32 /checkupgradeonly` - where 'D:' is the CD drive letter. This will run the test and report results without actually performing the upgrade.

No matter whether you're running Windows NT or 98, if you have examined your hardware and are worried that some crucial elements are not supported, then the best advice is not to upgrade just yet. Not only will this save you a lot of down time, it will also give you a chance to

learn from other people's mistakes. However, when you do finally make the jump you will find an operating system that is not just more stable and reliable, but also more user-friendly than either Windows 98 or NT4.

PCW CONTACTS

Terence Green welcomes your feedback. Contact him via the PCW editorial office or email win2000@pcw.co.uk



Mystery folder

Tim Nott answers the question most other **newsgroup respondents** simply dance around.

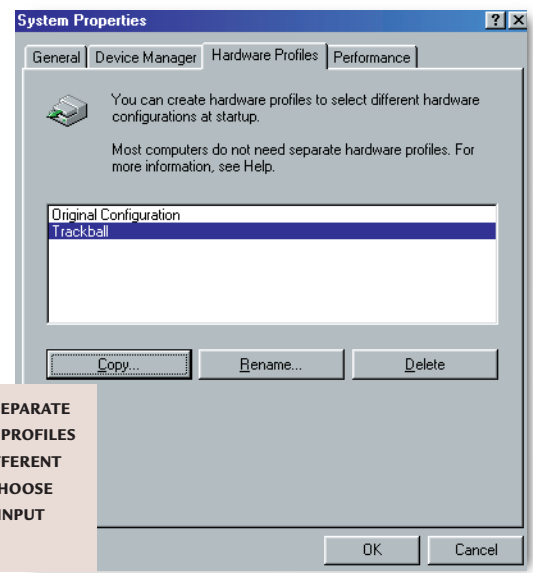
One of life's little mysteries is the phantom folder that opens at startup. It's a favourite topic among Windows newsgroups and conferencing systems. Usually the discussion goes for several rounds of 'if you leave folders open when you close down, they re-open when you restart...' followed by various methods of avoiding this with TweakUI. The accepted strategy is to enable the 'Save Explorer window settings' until such time as you have folders looking the way you want them, then disable the feature so they stay that way and don't reopen automatically.

At this point the churlish ingrate who posted the original query pipes up to say that yes, they know all about that and don't leave any folders open on shutdown anyway. The agenda then shifts to the myriad of possible ways that folders can be opened from the Startup folder or registry. Someone then points out that in Windows 98 you can hit the lot at once from the Startup tab of MSCONFIG.EXE. The discussion then takes a leap sideways into the ethics of software that parks its icon in the System Tray without being invited. Meanwhile, the poor instigator of this discussion is still stuck with the mystery folder. Nothing anywhere in the Startup folder, registry or .INI files is pointed at this folder. And usually the discussion peters out with the original problem unsolved.

Things went differently the last time this came up in the Windows 98 forum on the CIX conferencing system, and this time the story had a happy ending. Now I'm not going to name names, but if you think of famous motorcycles and

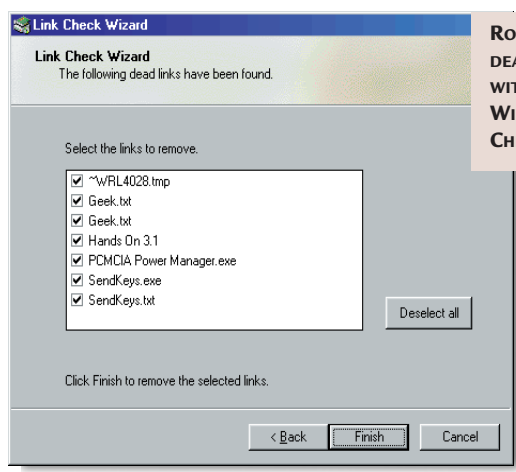
infamous utilities, you won't be far away. And the owner of the problem folder had a blinding flash of inspiration. He didn't have anything calling C:\BSA, but he did have a registry setting calling C:\BSA CRASHGUARD\SOMETHING.EXE. For reasons too mysterious to fathom, Windows was having one of its 'can't handle spaces in path names' turns, and would only read as far as the space. And as he had another folder named C:\BSA, up it would come.

Renaming the intended target folder to remove the space, then editing the registry to reflect the name change solved the problem. You can reproduce this problem if you create a shortcut to C:\BSA CRASHGUARD\SOMETHING.EXE and then edit the shortcut properties to knock off just the initial quote mark



CREATING SEPARATE HARDWARE PROFILES ALLOWS DIFFERENT USERS TO CHOOSE DIFFERENT INPUT DEVICES

Kit from the Windows 98 CD-ROM, then Start, Run, Checklinks, a Wizard will run that lists all the dead shortcuts on your system. You can right-click on a link to see details, or check its box to have it removed. One strange thing I noticed while testing this is that it sometimes doesn't pick up dead links until you hit the 'Back', then 'Next' buttons a few times.



ROUNDING UP DEAD SHORTCUTS WITH THE WINDOWS 98 LINK CHECK WIZARD

surrounding the target. A rather obscure problem, admittedly, but if it saves just one reader from the

brink of insanity, then my exposition will not have been in vain.

■ Burying dead shortcuts

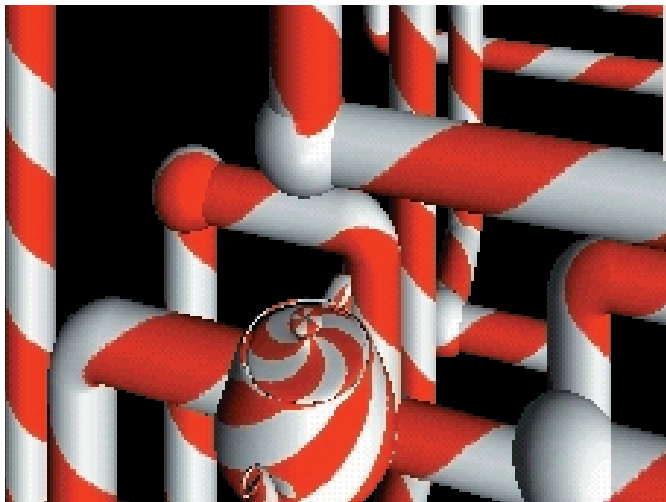
If you've ever spent time cleaning up dead shortcuts from your system, then you might be surprised, as I was, to find out there is a utility that does this automatically. If you install the Resource

■ Family affair

Tim Goldingham installed a trackball for a disabled user who couldn't use a mouse. This worked fine, plugging into its own card, but the user's children didn't like the trackball and wanted to stick with their PS/2 mouse. Some hardware - such as drawing tablets - will co-exist happily with another pointing device, but usually it isn't possible to use two pointing devices simultaneously.

It is possible, however, to alternate between them on a per-session basis by using hardware profiles. Go to Control Panel, System, Hardware Profiles, and then copy the existing profile, giving it another name.

With the new profile selected, go back to the Device Manager page, select the mouse branch and expand it. Go to the mouse properties and 'Disable in this profile'. Then add the drivers for the trackball to the new profile, but not the old. Reboot and you'll be asked to



TEA BREAK – A RARE SIGHTING IN THE 3D PIPES SCREENSAVER

■ Custom exercise

Further to last month's session on customising Internet Explorer and Outlook Express, I made a further discovery. To

choose between profiles: each will load only the relevant drivers.

■ Cutting corners in IES5

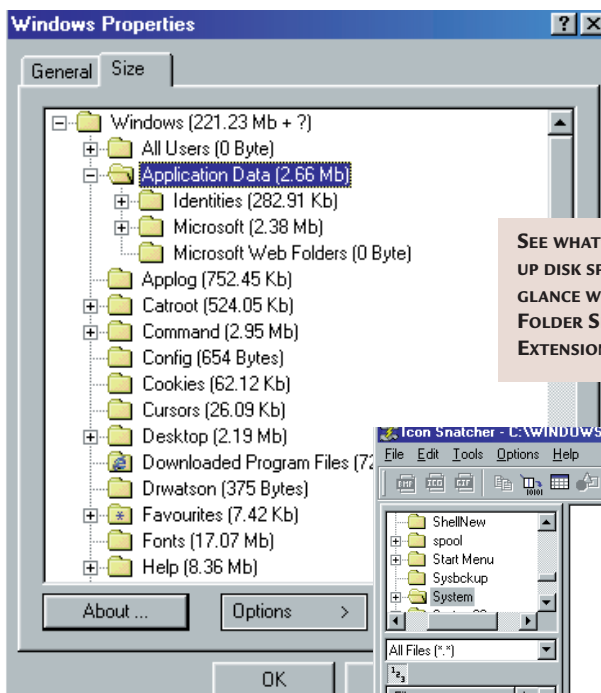
Last December, I replied to a query from Jennii Wallace concerning the ability to type, for example, 'hotmail' into Internet Explorer, and have it automatically fill in the 'www.' and '.com'. This was a feature of IE4 that seems to have disappeared in IE5. So my thanks go to Henry Gallagher, Nick France and Rufus Chapman for pointing out that this is still possible – just hit Control & Enter after typing in the partial URL, and the top and tail will be added automatically. It doesn't, however, seem possible to customise this or use multiple suffixes such as .co.uk or .net.

■ Giving a wide berth

I've mentioned before the trick of double-clicking on the joint to the right of a heading in Explorer's details view to fit the column width to the longest entry.

However, Mark Edmonds points out that you can optimise all the column widths at once by holding down the Control & Alt keys and then pressing the plus sign on the numeric keypad.

recap, the toolbar background for Internet and Windows Explorers is set from a string value 'BackBitmap' in HKEY_CURRENT_USER\Software\



SEE WHAT'S TAKING UP DISK SPACE AT A GLANCE WITH THE FOLDER SIZE SHELL EXTENSION

Microsoft\Internet Explorer\Toolbar. This points to the .bmp file used. However, after meddling about a bit with the IE Personalizer I discovered that a slightly different string value 'BackBitmapIE5', again containing the path to a .bmp, only affects Internet Explorer itself. The two settings can co-exist quite happily, so you

can have different toolbar backgrounds for IE and Explorer.

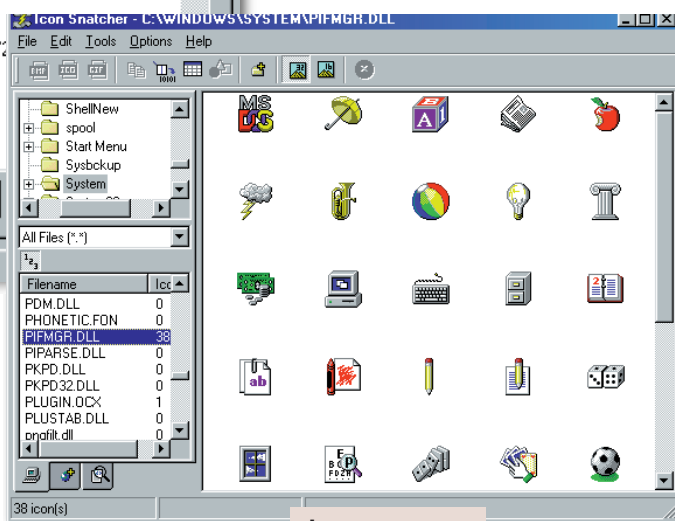
■ I'm a little teapot

If you have Windows 98, or a later version of 95, then you probably have the set of 3D screensavers. One of these is 3D Pipes, and folklore has it that if you set the joint style to 'mixed', then sooner or later, one of the ball-style joints will appear as a teapot. I'd always dismissed this as the sort of groundless rumour that one starts in rival companies to bring their productivity crashing down. Now I must admit I was wrong – I have seen the teapot, as the screenshot (left) shows.

■ Free stuff

There were two useful free utilities suggested by readers this month. Henry Bevan told me about the Folder Size Shell Extension. This adds a page to the properties of a folder, giving a tree view that shows the size of each sub-folder. You can find it at www.essi.fr/~berger/Windows/dfolder.html.

The other, suggested by Colin Howard, is called Icon Snatcher, and can be found at www.cdiware.com. This, as the name implies, allows you to copy icons from any file. Equally as useful, it also tells you where to look, by listing how many icons are contained in each file of the selected folder. It's a little rough around the edges, as it

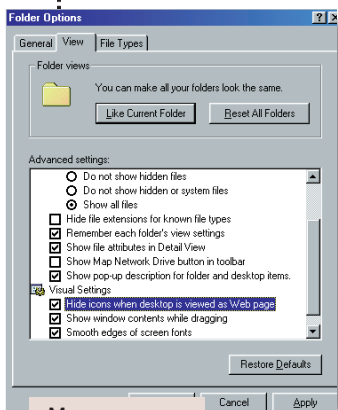


ICONSNATCHER – FREWARE THAT DIGS OUT ICONS FROM ANYWHERE

doesn't indicate when it is busy searching, (you just have to wait) and the filter to exclude icon-less files does not appear to work.

Questions & answers

Q Something I've always liked to maintain is an icon-free desktop. The only



MAKE YOUR DESKTOP AN ICON-FREE ZONE

icon I've found indispensable is the wastebasket, and this is now situated in the task bar, by placing a shortcut to the recycle bin in the Quick Launch folder. However, I cannot find any method to remove the 'My Computer' icon. Have you any suggestions?

DAVE VAUGHAN

a If you enable the Active Desktop and opt to view it as a web page, you'll find that in Explorer, View, Folder Options you can choose to hide all desktop icons.

Q When I download a file as text, the computer I use displays the file correctly. But when I open the text file in Notepad it is no longer word-wrapped. If I select Edit, Word Wrap, save and quit, and re-open the file, there's still no word wrap.

KEITH SCOTT

a This is a double buglet that goes back to the days of Windows 3. The Windows 98 version of Notepad does remember the

word-wrap setting between sessions, unlike its predecessors, but this is a global option – it isn't stored in individual text files, which are just a stream of characters. The other half of the bug is if you turn word wrap on or off, without making changes to a text file, you'll get a prompt to save the file when you exit Notepad. The contents of the newly saved file are identical to that of the original.

Q Is there a Windows 95 utility that makes multiple backups of the registry (as seen in Windows 98) so if the last backup is corrupt, you can go to the previous one?

COLIN CHOW

a Windows 95 has two registry backup utilities. The Configuration Backup tool can be found on the CD-ROM at Other\Misc\Cfgback, and lets you keep up to nine Registry backups in compressed form. However, you have to be running Windows to restore them. The Emergency Recovery Utility, (Other\Misc\Eru) lets you back up not just the registry, but other essential files. It defaults to backing these up to floppy, which can then be used to restore a defunct system, but it's unlikely the average registry files will fit on a floppy. You can, however, specify a hard disk location, then in the event of catastrophe, restore the files from MS-DOS mode, using the ERD.EXE command.

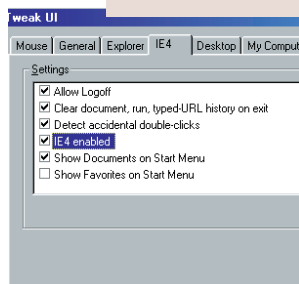
Q My Quick Launch toolbar, which I use a lot, has mysteriously disappeared. When I right-click on the taskbar, all the toolbar options are greyed out. I have tried everything including reinstalling Win98 and IE5 over the top of my original Win98. All

my original Quick Launch shortcuts are still residing in C:\WINDOWS\Application Data\Microsoft\Internet Explorer\Quick Launch.

BRIAN DEVANY

a The official MS answer to this is you have disabled IE4 in TweakUI, even though you are actually using IE5. Open TweakUI, go to the IE4 tab, and check that IE4 Enabled is ticked.

THE ANSWER TO THE DISAPPEARING QUICK LAUNCH TOOLBAR



Q What is the _wutl95.dll file? When loading Windows 98, I get the message that there is 'no association for this file and it is unable to be loaded: associate it or remove it...'

ALAN PRITCHARD

a It's left over from a failed installation. You'll probably find it in the Windows\Temp folder, where it can be deleted.

You'll also need to clobber whatever is calling it. Run MSCONFIG.EXE, go to the Startup tab, where you should be able to find the culprit and disable it.

Q Something strange has happened to my friend's computer. When we installed Windows it asked for his name and company, which was shown in System Properties under general. Somehow this has changed to Dr Mountain Dew.

NURHAFIZ ZAINAL

a This sounds like the aftermath of the virus attack that you wrote to me about some months ago which produced the 'stupid jerk' message in Word 97. This virus, which was apparently brought to a wider audience by a Japanese bank's email publicity campaign, has the side effect of sometimes changing names to Dr Mountain Dew. As you've now removed the virus, you can reinstate the correct name and company by using REGEDIT and going to HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion: the relevant entries are RegisteredOwner and RegisteredOrganization.

Q I have just discovered a directory on the drive with Windows 98 SE installed called CONFIG.MSI which contains 12,141 files all with RBF and RBS extensions. What is it and can it be deleted?

DAVID BANNISTER

a This is what Microsoft calls the 'rollback' feature when installing Office 2000. The files are backups and scripts, which means your previous installation of Office can be restored even if you cancel setup, or suffer a power failure in the middle of overwriting your Office files. The folder and its contents should be removed automatically after a successful Office 2000 installation, if not you can remove it manually. You can do this from MS-DOS mode if Explorer won't let you.

PCW CONTACTS

Tim Nott welcomes your feedback on the Windows column, but cannot deal with queries concerning the PCW CD-ROM or website. Contact him via the PCW editorial office, or email win@pcw.co.uk



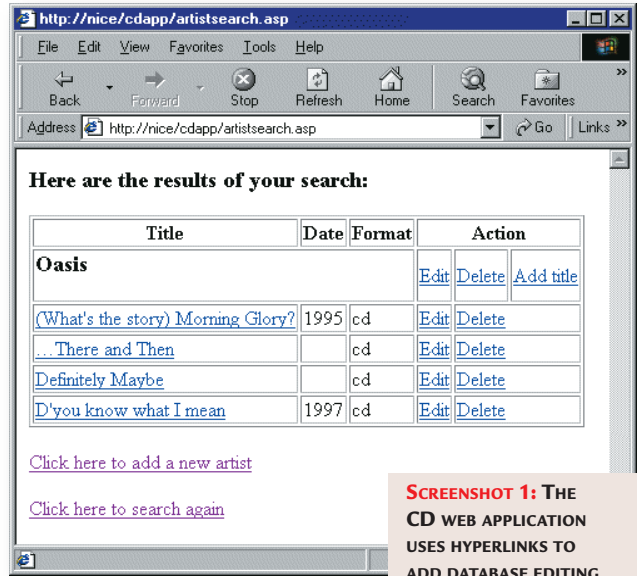
Component moments

Tim Anderson introduces component development with Active Server Pages.

Last month's column included a simple demonstration of how to query a CD database using Active Server Pages (ASP). The application has three pages. The first is a form for searching by Artist, the second displays a list of matching titles, and the third shows the track listing for an individual CD. The next stage is to enhance the application to allow deletions and updates. Another consideration is to improve performance and make the site easier to maintain by shifting code out of the HTML page and into separate components.

As with any application development, the starting point is to work out the design. A web application needs a different kind of design from the

traditional Windows style, particularly if you want to support any browser running on any operating system. The key functions of any database are searching, editing, adding and deleting records. A user-friendly way to include these features is to amend the search results page so that each record has hyperlinks for editing and deleting. This application also needs links to add a title by an existing artist, and to add artists to the



SCREENSHOT 1: THE CD WEB APPLICATION USES HYPERLINKS TO ADD DATABASE EDITING FUNCTIONS

FIG 1 edittitle.asp

```

<html>
<title>Edit Title</title>
<body>
<h3>Edit title</h3>
<% sTitleID=Request.QueryString
("titleid")
set thisCDHTML = server.createObject
("cdApp.cdHTML")
iTitleID = Cint(stitleID)
thisCDHTML.GetTitleValues
iTitleID,sTitle,iTitleDate
set thisCDHTML=Nothing %>
<form method="post" action =
"savetitle.asp">
<p><b>Title</b> <input type=
"hidden" name="titleid"
value="<%= iTitleID %>" >
<input type="text" name=
"title" value = "<%= sTitle %>"
size=50</p>
<p><b>Date:</b> <input type=
"text" name="titledate" value="<%=
iTitleDate %>" size=10</p>
<p><input type=Submit value="Save
title"></p>
</form>
</body>
</html>

```

(Key: ✓ code string continues)

database. **Screenshot 1** shows one approach. The design could be improved, for example, by using bitmaps for the Edit, Delete and Add buttons. It has been kept simple to show the basic approach as clearly as possible.

The web application has no concept of a current record, so to get this working correctly the primary key of the record to be amended or deleted has to be handed from page to page. This can be done by having the ASP script generate a parameter for each link. For example, the edit title hyperlink looks like this:

```

<a href="edittitle
.asp?titleID=
524">Edit</a>

```

Note that in order to preserve data integrity, the Delete function may need to delete any related records as well. For example, if an Artist is deleted, then Titles by that artist must also be deleted.

■ Implementing the new functions

Rather than implementing these new functions as ASP script, here is how it might be done using components. In this context, 'component' means a COM component, also known as an ActiveX DLL, running on the web server. The components will have two tasks. They need to perform database operations in response to calls from ASP, and they may need to generate HTML content to pass back to the browser. It makes sense to use separate components for these tasks as you might want to re-use the database components in a Windows application that has no need of the HTML aspect.

There are several approaches you can take in designing an ASP application with components. This example is intended to give you an idea of what is involved. Here is the sequence of events when the user clicks the Edit hyperlink for a CD title:

- The link calls edittitle.asp, passing the ID of the title required as a parameter.
- Script in edittitle.asp instantiates a COM component built in Visual Basic 6.0. It then calls a method of the component to retrieve the values of the required Title record and builds a form to display the title. The form's Action attribute points at a further ASP page called savetitle.asp
- Savetitle.asp instantiates the same

COM component, retrieves the form values from edittitle.asp, and calls a method of the component to save the title.

This approach has the advantage that no client-side scripting is needed, so browser compatibility is excellent. Data access is handled by the component, so Visual Basic's features can be used to validate the data or perform other processing.

Fig 1 shows edittitle.asp. Note how a hidden field is used to preserve the ID of the current title.

■ **The Visual Basic end**

This application used two COM components, cdHTML and cdData. The idea is that one component handles the interaction with ASP, and the other does the data access. This is a flexible system, since you might want to write other applications that use the same data access component.

Here is how to create the components using Visual Basic 6.0. Start a new project, choosing ActiveX DLL. Call the project cdApp, rename Class1 to cdHTML, and add a second class, cdData. Open up Project - References, and set references to the ActiveX Data Objects 2.1 library and the Active Server Pages object library. This second reference opens communication between your component and the current ASP session. It includes a ScriptingContext object with Application, Request, Response, Server and Session properties that match those available in an ASP script. You just need to activate the

ScriptingContext, like this:

```
Private thisContext As ScriptingContext
```

```
Private Sub OnStartPage (sc As ScriptingContext)
Set thisContext = sc
End Sub
```

OnStartPage is a method that gets called by the web server whenever this component is instantiated via ASP.

If you are running Internet Information Server 4.0 or higher, you can use a different technique. Set a reference to Microsoft Transaction Server in your project and call GetObjectContext() to retrieve an ObjectContext object. You can then get at the ASP objects through the Item property of the ObjectContext, for example:

```
thisObjectContext.Item ("Response").Write("<p>Some text</p>")
```

Whichever method you use, the result is you get full access to ASP from within your compiled Visual Basic component.

■ **Implementing the components**

What happens in the VB components is mostly standard VB programming. In this example, cdData creates an ADO connection in its Class_Initialize method. It also defines a CDTitle type for convenience in working with the data. For editing a title, there are two relevant methods. GetTitle takes a titleID parameter and returns the data for that title. SaveTitle takes a CDTitle

FIG 2

GetTitleValues method

```
Public Sub GetTitleValues (titleID As Variant, title As Variant, titledate As Variant)
Dim thisTitle As CDTitle
thisTitle = thisData.GetTitle(titleID)
title = thisTitle.title
titledate = thisTitle.date
End Sub
```

parameter and saves it to the database.

The other component is cdHTML. In its OnStartPage event handler, it obtains the current ScriptingContext or ObjectContext, and also instantiates a cdData object. The GetTitleValues method is listed in Fig 2. Note VBScript only passes variants as arguments. This method exploits the fact they are passed by reference to give them new values, that are then available in the calling ASP page. In the same way, the SaveTitle method accepts arguments from ASP that are stored back to the database.

A disadvantage of the ASP approach, inherent in many web applications, is that connections and recordsets are constantly opened and closed. It isn't as bad as it appears, particularly when you go a step further and host components in Microsoft Transaction Server, that] can cache objects and connections so they are not always recreated from scratch.

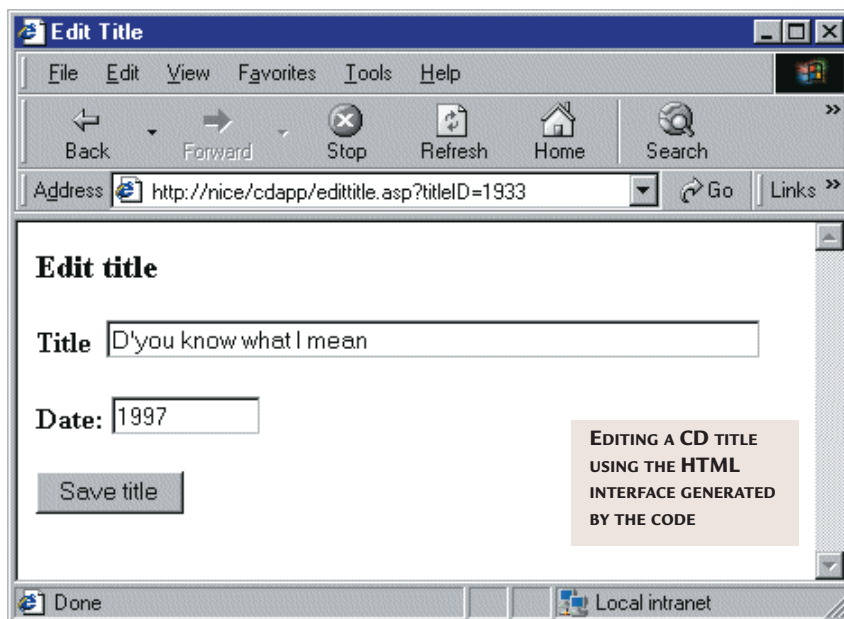
■ **What about Unix?**

You can't please all the people all the time. David Marty writes: 'As a webmaster with a Unix host, I find it frustrating that you've concentrated on Windows web servers. Please include more on Unix Apache and especially an idiot's guide to database system building on the web.'

My view is both operating systems have a place, so next month there will be a look at using MySQL on Linux.

PCW CONTACTS

Tim Anderson welcomes your web development queries, at webdev@pcw.co.uk. You can find this ASP example online at www.onlyconnect.co.uk/pcw/pcw_index.html. For further information, see the newsgroups microsoft.public.inetserver.asp.components and microsoft.public.inetserver.asp.db. Two recommended books are Beginning components for ASP (Wrox Press, ISBN 1-861002-88-2, £28.99) and Professional Active Server Pages 3.0 (Wrox Press, ISBN 1-861002-61-0, £43.99).





Memories are made of this

Andrew Ward advises **Athlon users** to install SP6, and checks out physical memory size.

Although new features are no longer included in new service packs from Microsoft, there is one small exception. Prior to Service Pack 6, the Windows NT kernel did not turn on the write-combining feature on the AMD Athlon processor. When the system starts up, Windows NT checks for the processor type, and Microsoft says if it detects a Pentium II or III chip (even though the feature is also present on the Pentium Pro), then it enables write-combining. Now with SP6, this check will also detect an AMD Athlon chip and correctly enable write-combining.

This speeds up video processing. Usually, many writes to video memory are individual pixels, which constitute a single 8-, 16- or 32-bit value rather than a full cache line of 32 bytes. However, the hardware architecture is optimised for burst transfers of full cache lines: writing data 16 bits at a time is much slower. Write-combining uses internal processor buffers to combine smaller or partial writes into full cache lines and hence into burstable writes.

If you have an AMD Athlon, upgrade to SP6 if you haven't already. The performance improvement could be as much as 15 per cent for graphics operations.

■ Memories

For those of us who spent years battling with memory managers like QEMM, DOS memory might still be of some passing interest. However, I'm sure Michael Rickard is correct when he writes in to suggest that what Paul McCormack (January issue) really wants to know about remote machines is how much physical memory they have, and not how much conventional and expanded memory is available to a DOS program. Unfortunately, my suggestion of using the MEM command therefore isn't going

As far as I know there is no command-line utility to return physical memory size

FIG 1 rmemsz.cmd – a command file to return a remote system's physical memory size

```

@echo off
rem get the physical memory size of a remote PC running NT4
rem requires access to the registry
rem uses regdmp (from resource kit or sdk or ddk) as this dumps
rem the REG_RESOURCE_LIST that is returned in a readable form
rem the script assumes that all LENGTH items are RAM
rem which is usually true
setlocal
set memkey="HKEY_LOCAL_MACHINE\hardware\resource\map\system
resources\physical memory"
set mc=-m
set pc=%1
if not defined pc set mc=
set memsz=
for /f "eol=# tokens=5" %a in ('regdmp %mc% %pc% %memkey%
^| find "LENGTH"') do (set /a memsz = memsz + %a / 1024)
rem if find didn't succeed bail out (usually regdmp failed,
and will have
rem written an error message to stderr
if errorlevel 1 goto :eof
if not defined mc set pc=local machine
echo %pc% reports %memsz% KB RAM
endlocal

```

(Key: ✓ code string continues)

to be of any help, and as far as I know there is no command-line utility to return the physical memory size.

Michael suggests a couple of tricks, however. The first, assuming you have command-line access to the remote machine via rcmd or some other mechanism, is to use the facility of winmsd to dump its data to an ASCII file. Simply type the following command:

```
winmsd /s /f
```

and it will write the system data to a file named %computername%.txt in the current directory. This does work, although you will then either have to read the file manually or write a simple script to parse the result.

Another technique is to use the regdmp command, although once again you'll need the resource kit for this (it's

also included in Microsoft software development kits for NT). Unfortunately, not only does this produce rather a lot of output, you'd also have to manually add up the three memory sizes that are displayed under the physical memory key. Michael provides a script to make life easier for you, shown in Fig 1. To use this script, type:

```
rmemsz \\remotepc
```

If you use it without any parameter, it will return the physical size for the local machine. Using regdmp assumes you have administrator rights on the remote machine. If you don't, it won't allow you access to the remote registry.

For those of you who aren't command-line wizards, a few words of explanation might be in order. Type FOR /?

to check out the FOR command – if all you're used to doing with it is typing things like:

```
for %a in (*.cmd) do find "regdmp" %a
```


then some of the constructions will be unfamiliar to you. First, eol=# is actually a dummy value – eol is required by the FOR syntax, although there aren't any lines within the output we wish to ignore.

Next, tokens=5 takes the fifth token from the line being parsed and places it into the variable %a. To distinguish between tokens on the line, white space is used as the delimiter because we haven't specified anything different. The fifth token is therefore the hexadecimal value that appears after LENGTH.

The /A switch to the SET command tells it to evaluate a numeric expression – necessary in this case because we want it to add the three LENGTH values into the memsz variable. A by-product of using the /A switch is that it is quite happy to accept values in hexadecimal notation, but the variable's value is ultimately reported to us as a rather more user-friendly decimal value.

A minor note is that variable names need to be preceded by two percentage signs when used in a batch file, whereas a single percentage sign is sufficient when you use FOR from the command line as in the example above.

FOR is designed to be used to process a set of files, but by enclosing a command – or sequence of commands – in single quotes, FOR will parse the output of those commands instead. The command FIND "LENGTH" is used to ensure that we only parse lines that contain the word LENGTH. In fact, we get the same result if we omit this, since the other lines either don't contain a numeric value in the fifth token, or it's too small to affect the result.

Now, I've left as an exercise for you to work out a similar script to parse the output of winmsd – it's really only the

FOR command that's of interest. You can also work out why the script shown in Fig 1 only works as a CMD file and not as a BAT file.

■ Sounds familiar

Stuart Taylor upgraded his system from Windows 98 to Windows NT4, but then discovered that once his Creative Labs Sound Blaster Live! drivers were installed the system would no longer boot.

Stuart found the Creative driver he was using didn't work with Service Pack 4, and so he downloaded a new driver from the Creative website. I'd just like to comment that this sort of occurrence isn't particularly unusual – so much so, that in general if I buy a piece of hardware I throw out the CD that comes with it and go straight to the web to look for new drivers (although not necessarily in that order). It's also a good idea to periodically check out the hardware vendors' websites for updated drivers for the hardware you already have.

■ Printing woes

Unfortunately, the downloading



SCREENSHOT 2 USE THE WINDOWS NT XJ6C DRIVERS FOR THE XEROX DocuPRINT C6

technique doesn't always work. A popular Internet shopping site for computer bits and pieces recently offered a colour printer and pieces recently offered a colour printer for less than £50. Linda Davies was among those who took advantage of the offer, but was dismayed to discover the Xerox DocuPrint C6 doesn't come with Windows NT drivers, and there aren't any on the Xerox website either.

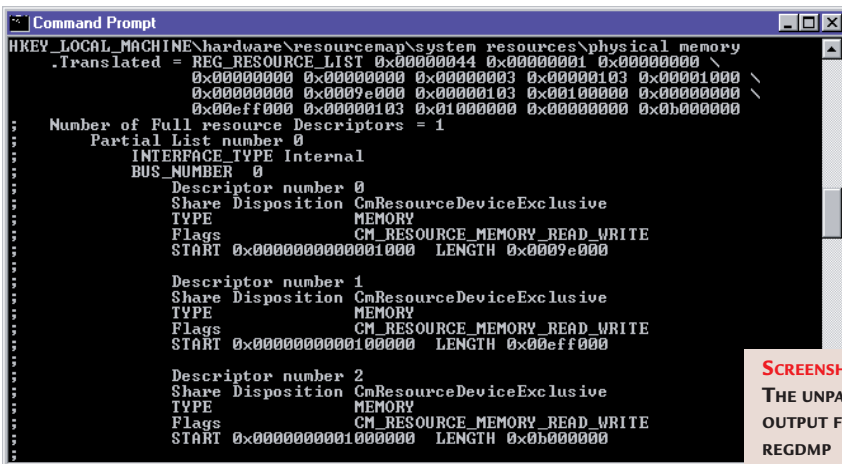
As usual, the technique of trying drivers for printers with similar-sounding names proved to be a useful workaround. So if you have one of these printers, download the driver for the DocuPrint XJ6C and try that instead.

■ Default system locale

A very common problem, and one raised this time by Richard Carey, is that of the default system locale for new users.

I'm sure we've all tried going to the Regional Settings control panel, ticking the box that says Set As System Default Locale, and then wondering why all new users still have their regional settings configured for English (United States).

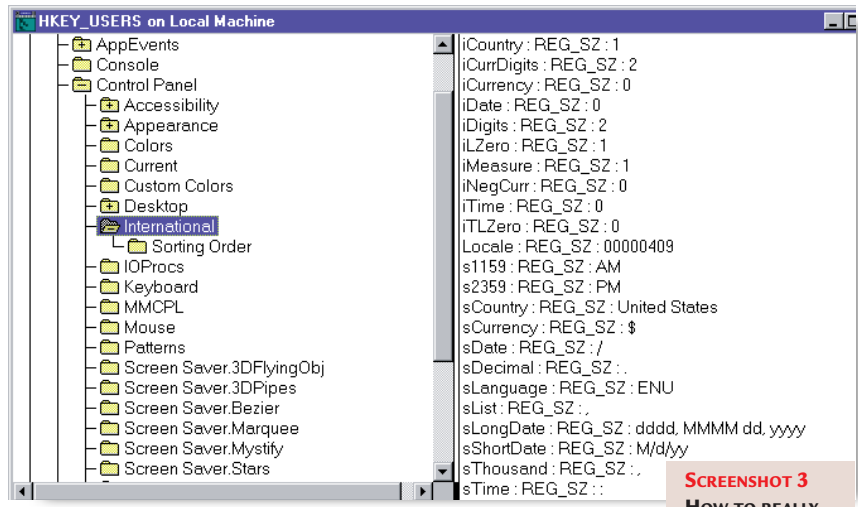
There is a way to solve this problem, and it's a question of modifying the NTUSER.DAT registry hive for the default user. This default hive is copied over whenever a new user logs on for the first time, and it will be in this folder: %systemroot%\Profiles\Default User



SCREENSHOT 1 THE UNPARSED OUTPUT FROM REGDMP



hands on windows nt



SCREENSHOT 3
HOW TO REALLY SET THE DEFAULT SYSTEM LOCALE

First, take a backup copy of NTUSER.DAT file by copying it to NTUSER.DAT.BAK. Then start up REGEDT32 and select the HKEY_USERS window. Select the Registry/Load Hive menu entry and then navigate to the default user NTUSER.DAT file to load it in. When asked to give it a key name, choose DEFAULTUSER. Then select the DEFAULTUSER key and navigate to the values you need to change. In this case, go to:

DEFAULTUSER\Control Panel\International
There you'll find lots of entries, like iCurrDigits, and you'll probably have no idea what to set them to. Therefore, it's a good idea before you get to this point to first navigate to the International key of a user you've already set up with the appropriate regional settings for your country.

Once you've tracked them down, from the Registry menu select Save Key and choose an appropriate location and filename (UK, FR, BE and DE are good examples of filenames to use). Everything in the International key will be saved to disk.

Now, go back to the DEFAULTUSER International key, and from the Registry menu choose the Restore option and select the appropriate file. The country settings will be read in from that file. Of course, you could make a note of the desired settings and make the changes manually, but that's rather long-winded.

To save the changes you've made, go and select the DEFAULTUSER key again

and now the Unload Hive option on the Registry menu will reappear. Select it, and the NTUSER.DAT file will be written back out to its original location.

What we've done so far will merely change the default locale for all new users created on this particular Windows NT server (or workstation). If we want to extend the changes throughout a domain, we need to set up a default user profile in the Netlogon share of the primary domain controller. Usually, this will be found at:

```
%systemroot%\System32\Repl\Export\Scripts
```

The easiest way to do this is to make a new user called Fred and configure his profile to exactly how you want the default profile of all new users to be.

Then, using the System control panel, copy Fred's profile to the Netlogon share. Note that no directory name will be created - you'll have to append \Default User to the end of the path to Netlogon. Also, before you click OK, click Change to set Permitted To Use to Everyone.

You've now set up a default profile on the primary domain controller, but it should also be copied to other domain controllers that are involved in authenticating user logons.

Mark Baugh has successfully upgraded a number of PCs, but unfortunately they're

■ Slow down you move too fast
Mark Baugh has successfully upgraded a number of PCs, but unfortunately they're

now too fast!
Apparently, an article on Microsoft Technet says applications written in FoxPro V2.5a won't run on anything faster than 333MHz, and Mark has gone and replaced aging 33MHz 486 PCs running Windows 3.11 with 400MHz Dells running Windows NT4. Now, the planned maintenance system written in FoxPro won't run.

This is an age-old problem. When people wrote software - in particular games - for the original IBM PC, they frequently built in some sort of dependency on the PC speed. The utility I'm going to recommend - Mo'Slo - was originally created to allow people to run these games on the new, faster 386 processors. Once software authors realised that processor speeds were on the increase, most ceased to include any speed-dependent code, but obviously that message didn't get through to the FoxPro developers!

Mo'Slo is available from www.hpaa.com/moslo. It works within a command session and will slow down any .com or .exe executable to the specified percentage of the current CPU speed. Hence the following command line will run GAME.EXE at 10 per cent of system power:

```
moslo /10 game.exe
```

There are three versions of Mo'Slo - a free trial version, the Deluxe version and a pukka business version that allows you to specify an absolute speed that will work across a variety of systems, rather than having to determine the appropriate percentage figure for different CPU speeds. Also, the default speed of the free version is a 4.77MHz IBM PC, whereas that of Mo'Slo 4Biz is a 166MHz Pentium which is adequate for most purposes, and probably just right for FoxPro. The 4Biz version is also able to slow native Windows applications in Windows 95 and 98 and has an optional hotkey feature to allow you to turn the slow-down on and off at runtime.

PCW CONTACTS

Andrew Ward welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email nt@pcw.co.uk
Mo'Slo Deluxe costs £12.50 and Mo'Slo 4Biz costs £14. Both can be purchased online from: <https://secure.reg.net/product.asp?ID=1041>

Key ideas and importing

Mark Whitehorn asks **whatever happened to** the Microwriter and revisits data transfer.

Does anyone remember the Microwriter Agenda with its chord



SCREENSHOT 1 THE MICROWRITER WITH THE SPECIAL INPUT KEYS HIGHLIGHTED

keyboard, or have any information on where to find add-ons? Mark Allen (webdesign@dtm.ntl.com) is trying to track some down.

For anyone who doesn't remember this strange machine, it was a device to be used with one hand: it had five keys (one for each finger and the thumb) and each letter was formed from combinations of these keys (**screenshot 1**). For instance 'a' was typed with the thumb, little and middle fingers, a combination that represented the outline of a capital A. People who liked the Microwriter (such as our resident Unix expert Chris Bidmead) liked it a lot, citing fast text entry and smacking their foreheads at those still pecking away at QWERTY keyboards.

It failed to catch on, but one of the original designers of the device, Chris Rainey (Chris@bellaire.demon.co.uk) was alive and well last time I heard. At that time he and a colleague were developing a keyboard wedge that enabled users to input data to a PC in the same way. The unit was about 110mm square and 30mm high (to the top of the keys) and plugged into a standard DIN five-pin keyboard socket

of an IBM PC. The standard keyboard piggy-backed onto the plug, allowing either device to be used for key entry

It was called Cykey as a tribute to the late Cy Endfield, who was co-inventor of the Microwriting system with Chris. Whether this got off the ground is unclear but, at the time of writing, more details can be found on the BOOG online homepage at <http://easyweb.easynet.co.uk/~len/boog>. BOOG? You mean you haven't heard of the British Osbourne Owners' Group? Shame on you.

It had five keys and each letter was formed from combinations of these keys

■ **Importing data**

In the January issue I started to look at the joys of moving data between PDAs. I said I'd complete the topic in February, but that column filled up before this

could be slotted in so, belatedly, here it is – my apologies for the delay.

As I said at the time, the problems (and their solutions) have more to do with the applications concerned rather than with the flavour of PDA that you are using.

In response to a request from George Hendricks I was moving a data file (in fact a file from the application called Data) on the Psion 5 and the destination was the Data app on a Psion 3 (Psion doesn't provide an automatic way of making this transfer).

We had extracted the data from the Psion in two ways:

- The data source file was moved to the PC using PsiWin. This offered to convert the file to a PC format and I chose Access. The data now appears in an Access table (in this case called Data – see **screenshot 2**).
- The same data was also exported from the Data application as a CSV (comma separated value) file.

SCREENSHOT 2 DATA FROM THE PSION CONVERTED TO ACCESS FORMAT BY PsiWIN

Name:	Home:	Work:	Fac:	Address:	Notes:	eMail:	UID:
AAAAnson	012 3456 7890	012 3456 7899	012 3456 7891	All the As, Bior Give us a A.Jof A.A@AA.COM			
Abcrombie & F				Four Seasons I			0000001
Addison-Wesley		01279 623623					0000002
Alter Nash		0171 359 4281			Old phones		0000003
Alpha Kahn		644227					0000004
Airport Dundee		643242					0000005
Alfa Club		Phone 0131 66					0000006
Alhambra Hotel		0171 837 9675	0171 916 2476	17 - 19 Argyle S			0000007

SCREENSHOT 3 THE SAME DATA MOVED AS A CSV FILE AND THEN IMPORTED INTO ACCESS

Name:	Home:	Work:	Fac:	Address:	Notes:	eMail:	UID:
AAAAnson	012 3456 7890	012 3456 7899	012 3456 7891	Alperton.	Give us a A.Jof A.A@AA.COM		4
Abcrombie & F				Four Seasons I			6
Addison-Wesley		01279 623623					
Alter Nash		0171 359 4281			Old phones		
Alpha Kahn		644227					
Airport Dundee		643242					
Alfa Club		Phone 0131 66					12
Alhambra Hotel		0171 837 9675	0171 916 2476	17 - 19 Argyle I			13

This CSV file was then transferred to the PC (without using PsiWin to perform the conversion) and imported into Access as a table called DataOut (**screenshot 3**).

One of the 'dangers' of the second route is illustrated in **screenshot 4** (see next page). This shows that Access failed to correctly import some of the data from one particular field – UID. This field is used in Psion 5 databases to uniquely identify each record. The field contains



hands on

PDA's

Internet
Windows 98
Software
Graph
Windows
Tools

Error	Field	Row
Type Conversion Failure	UID:	4
Type Conversion Failure	UID:	5
Type Conversion Failure	UID:	6
Type Conversion Failure	UID:	10
Type Conversion Failure	UID:	11
Type Conversion Failure	UID:	16

SCREENSHOT 4 ACCESS CAN IMPORT SOME OF THE DATA INCORRECTLY, WHICH CAN PRODUCE PROBLEMS – BUT THESE CAN BE OVERCOME

numbers in hex such as 00000004, 00000029 and 0000002E. The import wizard looks at the data in the field and decides what sort of data it is.

Clearly, in this case it has looked at the first record, seen a value such as 00000029 and decided that this is a number field. Of course, in the broad scheme of things this is a number. It is a hexadecimal number equal to 43 in decimal. The trouble is that the import wizard has set the data type of the UID field as 'number' and when values such as 0000002E are imported, the number field refuses to accept them because it sees the E part of the hex number as a text character. It is a case of 'for hex, read text throughout'.

We can fix this by deleting this table, re-running the import wizard and manually changing the data type for this field to text. But I won't bother, because the other problem I have is that the database currently has a record length of 14 fields by approximately 50 characters, equalling about 700 characters (screenshot 5). The target application (Data on the Psion 3) only imports lines

equalling less than 255, or at least, that's what it says in the manual. So I pulled the data into Access in order to shorten the lines and, since the UID field isn't required in the target, it is about to be deleted anyway.

In my case, most of the fields had been so little used that some serious pruning could be carried out while leaving 99.9 per cent of the data intact. The field sizes shown in screenshot 6, reading from the top, are 50, 20, 20, 20, 20, 100 – which is well inside the limit.

After that, select File, Save As/Export (screenshot 7 opposite) and Access provides a file export wizard (similar to the import wizard) where you can configure the output. It is worth selecting the option that adds the field names as the first line of the file.

All that remains is to connect the Psion 3, drag the file to the Psion, allow PsiWin to convert it to a Psion Data file and, once the file has been moved and converted, open it with Data.

The bottom line is that, if you are going to move data between PDAs, use a converter if one is available. If not, text files are a

good carrier and you can use tools such as Access to tidy the data as it passes through the PC.

■ Get with the program

A while ago I moaned about the lack of a built-in programming language in Windows CE. Some form of OPL has always come with members of the Psion family and its easy availability has led many people to write a lot of good software. Tools are certainly available for programming WinCE machines, but none are provided as standard with the kit: anyone wishing to program must first locate, purchase, download and install the chosen package.

John Parr (chromedome@shockwave.nwnet.co.uk) wrote in to recommend visiting www.aristar.com, which has

Field Name	Data Type
Name:	Text
Home:	Text
Work:	Text
Fax:	Text
Address:	Text
Notes:	Memo
eMail:	Text
UID:	Text
FirstName:	Text
HomeAddr:	Text
HomeCountry:	Text
MidName:	Text
Company:	Text
Date:	Date/Time

SCREENSHOT 5 THE DATABASE, AS IT STANDS, IS GOING TO GENERATE LINES THAT ARE TOO LONG TO IMPORT INTO DATA ON THE PSION 3

developed something called Dialect. According to John this

allows you to write programs with a normal text editor or the integrated development environment. You can define a GUI front for your programs with the full array of text boxes, labels, command buttons, radio buttons, drop-down menus, establish network connections and do file handling. The basic version is free for non-commercial uses and the licensed version is only \$99 (£61.88). But John says the best thing about it is that the code can be transported to Win9x & NT, because Dialect is also available on these platforms. Once ported to these, Dialect can generate a free-standing EXE.

My own current favourite is Visual CE

Field Name	Data Type	Description
Name	Text	
Home	Text	
Work	Text	
Fax	Text	
Address	Text	

Field Properties	
Field Size	50
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	No

SCREENSHOT 6 AFTER SOME MAJOR SURGERY, MOST OF THE DATA REMAINS, BUT THE LINE LENGTH IS PERFECTLY ACCEPTABLE

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

Wonders of the web

Remember, remember, the fifth (version) of DeVender. Mark Wheadon tells me the PDA version of the arcade game Defender has been ported to the Psion Revo. www.rmrsoft.com/epoc/defend.htm.

Penguin power

Simon Wright (simon@pogner.demon.co.uk) reports problems reaching Penguinbackup, that wonderful backup utility for Palm Pilots.

This is stored on a single floppy disk and works on any PC with a serial port and a floppy. It's a compact version of Linux, complete with Pilot backup programs. Boot up from the floppy and follow the menus.

Unfortunately, due to an errant dot in the January issue, the site address was given as www.ipd.ira.uka.de/~writte/pilot/backup, which doesn't work because the address is: <http://www.ipd.ira.uka.de/~writte/pilot/backup/>. Note the lack

of dot between www and ipd.

Another URL

Russell Howe (rhowe@mindless.com) recently discovered the site www.palmtop.nl/ where, he says: 'It seems like they do quite a lot of PDA software and the page www.palmtop.nl/free.html is quite good. They even have a Spectrum emulator which means an extra "6,600 games for your Series 5, Series 5mx or Geofox"!

4.0 from Syware (www.syware.com) because it has excellent hooks into databases. Features include support for Pocket Access, a good range of data types, as well as an ODBC driver for accessing data in CE devices from Microsoft Access, Lotus Approach, Delphi and Visual Basic.

To slot or not

Dave Lucas (Dave.Lucas@landinst.com) writes that he is looking to connect storage devices to a Casio E-105 palmtop, but that it only has 'a CF+ interface rather than the more useful PC Card interface'.

The Casio has a Type II slot, and the only difference between this and the Type I is that the Type II is physically slightly deeper. So, Dave is free to fit any CF Type I or Type II Flash RAM card.

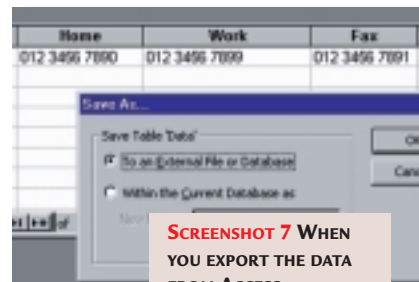
Of course, the perfect answer ought to be an IBM Microdrive. This whizzo miniature hard disk slots into a CF Type II slot and provides a whopping 340MB of storage - which equates to over 600 high-resolution pictures from a digital camera, for instance. However, there is one problem...

The Microdrive is a Type II device and, even when fitted into the correct Type II

slot, it is a tight fit. IBM states categorically that it should not be fitted into a Type II slot if there is no manual ejection mechanism for removing the

drive and, unfortunately, the Casio E-105 lacks one of these.

Now it turns out that the Microdrive has a tiny ridge on it which looks like it's just big enough to be levered with a fingernail. In the interests of science, I took my E-105 in my hands and popped in a Microdrive. It worked perfectly and provided the expected huge data store. Then, with bated breath I applied my fingernail and... the drive slid painlessly out. So it worked for me, but the fit is tight and there is no guarantee it will work for you. Since IBM explicitly



SCREENSHOT 7 WHEN YOU EXPORT THE DATA FROM ACCESS...

suggests you don't do this; if asked whether I can explicitly recommend the idea I would have to say (with shades of HAL): 'I don't think I can do that Dave.'

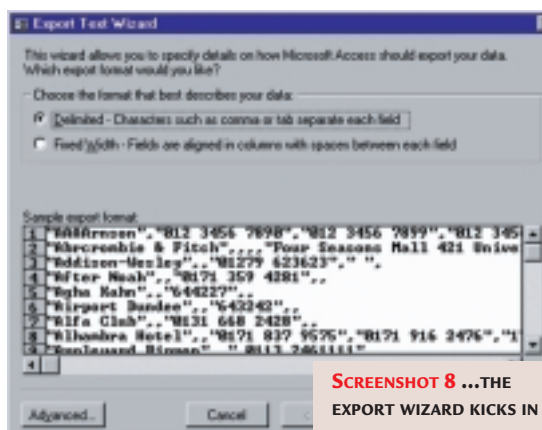
Caught speeding

My recent speed testing of the entire range of Psion 3s and 5s elicited these extra results from Jonathan Quirk (jonathan@quirk.force9.co.uk). He dug out his retired Psion Organiser II LZ. Luckily he had only recently recharged its NICAD PP3 so was able to type my program listing, Penguin. (It says much for the portability of OPL that he only had to discard the EndP statement for the procedure to compile and run.)

The figures he recorded were: Write 1,000 statements: 499 seconds Perform 100,000 increments: 590 seconds which shows that writing to the LCD - even when it is only four lines x 20 characters - is a time-consuming business. The processor is Hitachi's HD6303X, which Jonathan thinks was a low-power (CMOS) version of the Z80 with some additional capabilities.

Database delights

Following my comments a while ago concerning the slow running of databases on my Psion Series 3, Steven Pemberton (Steven.Pemberton@cw.nl) pointed out, for anyone who wasn't aware of the fact, that sorting records in the Psion database slows down retrieval speed. This is entirely counter-intuitive for database freaks, who are brought up on the idea that indexing records enables them to be viewed in order (alphabetical, numerical, whatever) and also increases the retrieval speed.



SCREENSHOT 8 ...THE EXPORT WIZARD KICKS IN AND DOES THE WORK FOR YOU

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Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office or email pda@pcw.co.uk



Drive time

A wild-goose chase for an old SCSI 2 drive throws up a few partition problems for Chris Bidmead.

I've been trying to get hold of a small SCSI 2 hard disk to refurbish a Canon object.station very kindly bequeathed to this column by Martin Reed of Apple. Alas the days of SCSI 2 drives (with the 50-pin connector) have long gone and nobody seems to have these around.

I was talking to John Fox, IBM product marketing manager for storage, about this and he promised to hunt around and see what he could come up with. He returned somewhat apologetically a few days later to say that the smallest drive he could find was 9GB, and it was Ultra2 Wide SCSI, with a 68-pin D-type connector.

'Capacity should not pose you any integration issues,' John emailed me, and indeed 9GB is a nice advance on the object.station's original 500MB.

'Nor would 68-pin, beyond the necessity of sourcing a 50-to-68-pin adaptor,' he added. That was useful info, because I didn't know you could fit Ultra2 Wide to an old-style SCSI 2 host bus adaptor (HBA). Ah, but there is one issue, John went on to mention. Ultra2 uses LVD (low voltage differential) and needs active rather than passive termination of the SCSI bus signals. 'The bottom line is you need to source an LVD active terminator,' he added.

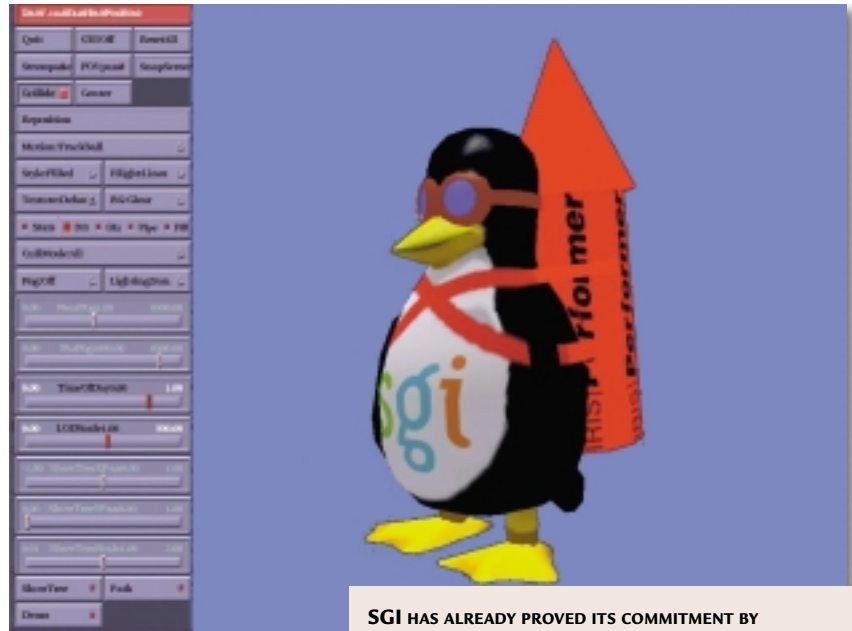
Well, the problem is I can't swap out the HBA on the object.station because it's an old VL-bus component. The busmastering VL-bus slot on the object.station motherboard is the fastest available - the rest are old ISA slots. Luckily I had another option.

My favourite workstation is still the

two-year-old IBM PC315 with its 200MHz Pentium Pro processor. Oddly,

although it has an Adaptec Ultra2 Wide controller, it's driving a couple of 2GB SCSI 2 hard disks (or DASDs, as IBM insists on calling them, although no-one can remember what the acronym stands for). So the logical thing would be to put the new 9GB drive in there and move one

Alas the days of SCSI 2 drives (with the 50-pin connector) have long gone



or both of the SCSI 2 drives into the object.station.

The PC315 is in active use, and has a hand-tailored Mandrake 6.1 Linux installation on it. Did I feel confident about being able to shift everything across to the new drive without messing up my carefully crafted setup?

■ Drive migration

It turned out to be easy enough to attach the new 9GB drive. The Adaptec HBA has 50-pin and 68-pin outputs, and I used an Ultra2 cable to hook in the new drive, ensuring it was on a different SCSI device number from either of the other drives (which were,

as I expected 0 and 1) and the CD-ROM drive, which was 6. I set the new drive

to 5. Linux attributes SCSI drive device names in the order that they're found on the SCSI bus, so when the system booted the new drive was identified as /dev/sdc.

I used FDISK to create new partitions on the drive corresponding to my existing partitions housing /, /usr, /opt, /var and

SGI HAS ALREADY PROVED ITS COMMITMENT BY DONATING THE XFS 64BIT JOURNALLED FILESYSTEM TO THE LINUX COMMUNITY AND THE COMPANY HAS ALSO BEEN WORKING WITH THE LINUX KERNEL TEAM TO ADD SUPPORT FOR OpenGL GRAPHICS LIBRARIES TO THE OS. BUT NOW SGI HAS GONE EVEN FURTHER BY OFFERING ITS FLAGSHIP HIGH-PERFORMANCE GRAPHICS SOFTWARE TOOLKIT, IRIS PERFORMER 2.3 FOR LINUX, A REAL-TIME RENDERING TOOLKIT FOR INTEL-BASED SYSTEMS. THIS IS AVAILABLE AS A FREE DOWNLOAD AT: WWW.SGI.COM/SOFTWARE/PERFORMER/DOWNLOADS.HTML. I HAVEN'T BEEN ABLE TO DISCOVER THE EXACT LICENSING TERMS - DOES ANYBODY KNOW?

/home. Then I mounted each of these partitions onto temporary mount points and copied data across from the existing partitions on /dev/sda and /dev/sdb. I did this using the cp command with the -a switch, which preserves as much info as possible about the files, and works down through all the subdirectories.

There are a few things to watch out for here. Firstly, cp -a will copy the contents of mounted directories. So cp -a /mnt/tmp/mnt copies not just the mount points (which is what you probably want to do), but also the entire contents of any directories mounted there. Similarly cp -a /dev/tmp/dev is definitely not what you want to do. You won't recreate the device names: you end up copying their entire contents, so /dev/sda, say, will end up as a file containing the whole of your first hard



ANOTHER BIRD, ALTHOUGH I DON'T KNOW WHY PUBLISHERS O'REILLY HAVE CHOSEN A HORNBILL TO REPRESENT SAMBA, THE OPEN SOFTWARE FILE AND PRINT SERVER FOR HETEROGENEOUS NETWORKS (IE, IT PROVIDES WINDOWS-TYPE SHARES). THE BOOK IS A MUST FOR READERS LIKE LAURENCE CRUMMAY

choice), and I've done some of them. For example, the -c switch can point lilo to an alternative configuration file, in which you can use the "boot=" parameter to install the LILO boot code somewhere other than your present working LILO setup. So if, for example, you have a BIOS that allows you to choose which drive you boot from, you can preserve (say) /dev/sda as the boot sector for your working setup up, while experimenting

with exotic LILO installations on /dev/sdb.

But I realised that figuring this one out was going to take a

long time to get right, with multiple reboots in between. So I decided to cheat. To heighten the excitement, I wasn't sure if the cheat would work.

The idea was, having got my system across to the new drive, to see if I could remove the old drives, reset the new drive to SCSI 0 and then boot off the Mandrake 6.1 installation CD, telling it I wanted to upgrade my system. Unfortunately, Mandrake wasn't fooled by this, and failed to recognise an existing Linux system. Perhaps I should have spent some time investigating why, but instead I did the second best thing: a new installation, but without any reformatting of the partitions.

I used FDISK during the installation to assign the various partitions to the main Unix directories I'd planned them for (I've always found pencil and paper essential here, and luckily I had the directory to partition assignments all jotted down). And I minimised the amount of Mandrake material that would pour in from the CD-ROM by choosing Custom Installation and avoiding installing any packages.

If you do this, the basic system stuff still gets installed, and a few key config files get overwritten. The advantage of reinstallation is that this makes it easy to get the LILO boot stuff right. And once I was rebooted with the new kernel, it wasn't hard to reinstate the odd munged config file by hand. I seem to remember

disk drive. (The correct way to recreate these devices, if you ever need to, is to run the script called MAKEDEV you'll find in the /dev directory. This builds the devices in whichever directory you run it in. The Linux man page for MAKEDEV will fill you in on the detail).

Copying /proc is a nonsense, as this is a kind of pseudo filesystem that reflects the current state of play. All you need is an empty directory of that name - the running kernel does the rest.

To stave off email from Unix diehards, I'd better point out that traditional versions of cp on other Unixes, like AIX, don't understand the -a switch. The canonical way of copying a complete hierarchy of directories has always been to use tar through a pipe, something like this:

```
cd /var ; tar cf - spool |
(cd /mnt/spool ; tar xvf - )
```

This is moderately unpleasant to get your mind round, and unnecessary if you

use the GNU version of the cp utility, which is portable across every Unix in the known universe.

The general idea was to duplicate my existing setup as closely as possible onto the new drive. But I quickly realised there would be horrendous complications if I went all the way and tried to create a lilo setup on /dev/sdc that would work properly when I removed the other drives, renumbered the new drive as SCSI device 0 and booted it up in its new role as /dev/sda.

Yes, it is theoretically possible. There are some very cunning things

you can do with lilo (for clarity, I'm using lilo to mean the setup utility that comes with the operating system, and LILO to denote the actual boot code that gets installed in the boot sector of your

Traditional versions of cp on other Unixes don't understand the -a switch



there were four — /etc/hosts, /etc/resolv.conf), /etc/HOSTNAME and /etc/sysconfig/network. And that was only because I couldn't be bothered to go through the network section of the installation.

The new setup is great, and notably faster, thanks to the Ultra2 drive. I'll let you know how I get on with reinstating the object.station.

■ Watch those partitions

A general point about partitioning emerged from the exercise and it is worth relaying here. You'll know that PC-style disk drives have a top limit of four primary partitions. The standard way round this is to set up one of these as an 'extended partition', within which you can create multiple 'logical partitions'. Linux labels these from five upwards, so in the case of SCSI drive 0 they'll be /dev/sda5, /dev/sda6 and so

on. Logical partitions are more flexible than primary partitions because the information that defines them is stored in a linked list. A side effect of this is you have to be careful when deleting logical partitions. Take a look at Fig 1.

/dev/sda1 is a primary partition, and the extended partition, /dev/sda2, occupies the rest of the drive. Logical partitions five through 10 lie physically within /dev/sda2, but if you inspect the start and end addresses you'll notice that /dev/sda9 and /dev/sda10 are really seventh and eighth in the physical order. How so?

The original /dev/sda7 and /dev/sda8 were equal sized, and allocated to /var and /usr respectively. However my /usr was

SGI MAY BE PORTING ITS HIGH-END GRAPHICS TOOLS TO LINUX, BUT THE FREE SOFTWARE COMMUNITY HAS ALREADY DEMONSTRATED WITH PRODUCTS LIKE THE GIMP THAT PROFESSIONAL-QUALITY GRAPHICS APPS CAN BE WRITTEN FROM SCRATCH IF NECESSARY

huge and stuffed full, whereas /var was barely two per cent used. So I went into single-user mode (telinit 1 from

the command line), backed up the whole of each partition, unmounted them, and then entered FDISK. Now it was simply a matter of deleting /dev/sda7 and /dev/sda8 and recreating them with their sizes allocated more appropriately. When I say simply...er... well, it's certainly easy enough, and this kind of low-level messing about is exactly what runlevel 1 (single-user mode) is for. But watch out for those linked lists!

If you delete partition 7 and then partition 8, the second deletion will actually remove /dev/sda9. This is because following the first deletion, the partitions numbered above it all decrement by 1. So always begin your

deletion with the highest number and work downwards. Of course, until you actually write the new partition table to disk you haven't changed anything, so provided you're careful you can experiment extensively with partition deletion and creation. A useful tip if you're inexperienced with partitions (which I haven't followed here) is to make every partition a different block size. Then you can associate that unique number in column 4 with its functional mount point when you jot down your directory allocations. /usr = 1510078 will remain true while you delete and create other partitions. As we've seen /usr = /dev/sda9 is written on water.

You'll notice that no Windows partitions were involved — the complication of trying to preserve those wretched DOS-style drive letters as I swapped partitions around would probably have scared me from getting started. If you're using a dual-boot Windows/Linux system, as I know many readers are, you may be inclined to accuse me of short-changing you: I should have faced the challenge. Alternatively, you might see this as another example of how half-baked ideas in Windows hold you back from control of your system. In which case you'll appreciate the value of my ongoing advice to reduce your dependency on Windows.

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email unix@pcw.co.uk



FIG 1

```
[root@pc315 bidmead]# fdisk -l/dev/sda

Disk /dev/sda: 255 heads, 63 sectors, 1115 cylinders
Units = cylinders of 16065 * 512 bytes

Device Boot      Start         End      Blocks   Id  System
/dev/sda1 *        1           115     923706   83  Linux
/dev/sda2          116          1115    8032500   5  Extended
/dev/sda5          116           230     923706   83  Linux
/dev/sda6          231           345     923706   83  Linux
/dev/sda7          592           608     136521   82  Linux swap
/dev/sda8          609          1115    4072446   83  Linux
/dev/sda9          346           533     1510078+  83  Linux
/dev/sda10         534           591     465853+   83  Linux
```




Catch 1904

Tim Nott gets caught up in **frustrating files, lineless lines** and still finds time to answer your queries.

This month I thought it was about time for a thorough clean-up of the machine that writes this column. So having backed up everything I thought I might need, I re-installed Windows 98 and MS Office 2000 on to a clean hard disk, selecting only the components of the latter that I really needed.

Despite forgoing the delights of Outlook, PowerPoint and Access, Office still took absolutely ages to stagger off the CD on to my hard disk. But worse was to come, in the shape of a little error message that popped up, saying 'Error 1904. Module C:\Program Files\Common Files\Microsoft Shared\VBA\VBA6\VBE6.DLL failed to register. HRESULT -2147024894. Contact your support personnel.' No, I didn't know what that meant either and since clicking on Retry produced nothing but the same message, I hit the Skip button and continued.

The significance became clear when I went to run a macro in Word. A flurry of error messages informed me that Word had committed a variety of illegal acts, couldn't initialise the VBA environment and would close down. Fortunately, it didn't deliver on the last threat and I was able to continue and save my work.

The problem persisted after re-booting, to the extent that creating

FIG 1 The textbox format macro

```

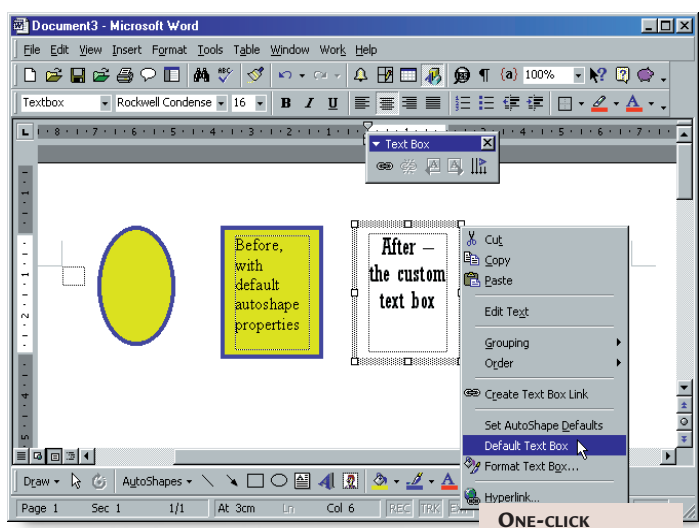
Sub Texty()
On Error GoTo Whoops
Selection.Style = ✓
ActiveDocument.Styles("Textbox")
Selection.ShapeRange.Fill.Visible = msoFalse
Selection.ShapeRange.Line.Visible = msoFalse
Exit Sub
Whoops:
MsgBox ("That is not a text box")
End Sub
(Key: ✓ code string continues)

```

any new document with an Autonew macro in the template produced the same rash of errors. Now, Office 2000 has this rather fine feature called 'Detect and Repair'. So I did. And it didn't. Back came that good old error 1904.

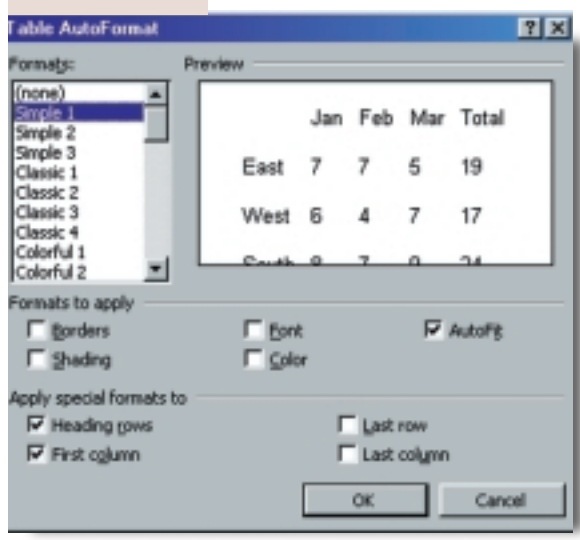
After a lot of web- (and soul-) searching, I found comfort in the

disk and replace it with a fresh copy from the CD. The next step was to use the Knowledge Base tip to register the file manually. Go to Windows 'Start, Run...' and type in RegSvr32 followed by a space, then the path and name of the file. Unless you really love typing, the easiest



ONE-CLICK CUSTOMISATION OF TEXT BOXES

TABLES À LA CARTE WITH NO BORDERS



fact that I was not alone – other users had posted this problem in news-groups – and there was a fix on the Microsoft Knowledge Base, which showed how to register the file manually. This, however didn't work, and donning my scruffy old DOS anorak and using the FC command revealed that the copy of VBE6.DLL on my hard disk differed from that on the CD. It seems it had been corrupted during copying.

So, step one was to delete the corrupt VBE6.DLL from the hard

way to do this is to navigate to the VBA6 folder mentioned above in Windows Explorer, and drag the VBE6.DLL file into the 'Run' box. This, happily, did the trick, but I'm still wondering why this particular file should be so accident-prone on installation.

■ Bordering on the insane

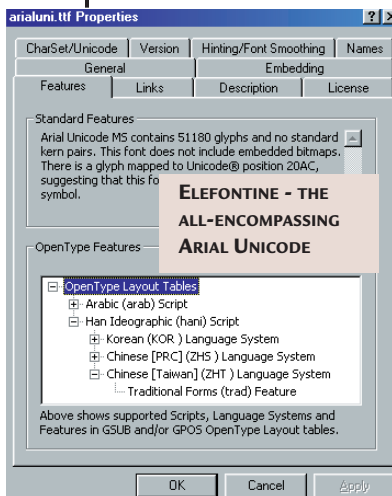
Last May I mentioned a workaround for Word 2000's irritating habit of assuming you want borders on every table you create. To recap, the trick is to go to the Table, Insert Table... dialog, then hit the Autoformat button. Select any style, except '(none)', then turn off the borders and any other options you may not want. OK out of the Autoformat dialog, then make sure you have the 'Set as default...'

Questions & answers

Q Is there a font that contains the entire Unicode character set? Or is this impractical?

ROB PALMER

a Yes – *Arial Unicode MS ships with Office 2000*



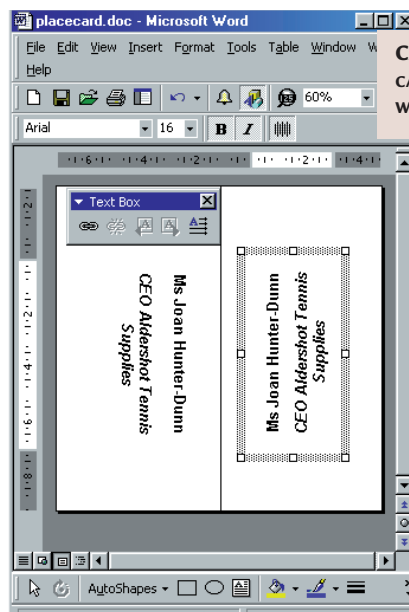
and contains 51,180 glyphs, covering all code points in Unicode Standard 2.0. It weighs in at 23MB, which

probably answers your second question as well.

Q I want to print some fold-over cards giving the name and job title of participants at a seminar. The same text needs to be printed on both faces of the 'tent', which means one lot must be upside down. How can I do this in Word? I can turn text in boxes through 90 degrees but not 180, and I'd prefer to do the job with one print run.

ANGELA LLOYD

a *Two methods spring to mind. First, using WordArt with the plainest formatting (top left sample in the preview box) gives you text that can be rotated through any angle. A rather more elegant method, which was suggested by our NT correspondent, Andrew Ward, is to create the card on its side. Create and fill the first text box, then copy and paste it. Turn the text in the left-hand box through 90 degrees*



clockwise, (Format, Text Direction), and that in the right-hand box 90 degrees anticlockwise.

Q I've created a macro in WordPerfect 8: how can I get it on to a toolbar? All I seem able to do is to get a button that lists all the macros.

RICHARD FIENNES

a Word document?

NIGEL CORNWELL

a *This quick and dirty little piece of VBA will return the ASCII code of the character to the right of the cursor:*

```
Sub Ascwhat()  
MsgBox Asc(Selection)  
End Sub
```

option ticked before leaving the Insert Table dialog.

There's a similar irritation with text boxes – by default, Word assumes you want a thin line around these. This isn't quite like the rest of Word's borders – it's referred to as 'Line' in the right-click, Format, dialog box, and the 'No line' option is under 'Color'. In any case, the cure is easier – set the line and shading of any text box to the desired default, then right-click and 'Set Autoshape defaults'. Bingo – all your new text boxes will be like the one selected.

Problem solved? Not really, because only the border, fill, text direction, wrap and a few other settings are saved – not text formatting or alignment. Second, the default is only saved for the current document. Third – and this is the really good bit – the default applies to all shapes that you subsequently draw. So, if you've set your text boxes up with no line, then anything else you draw will have no

line. Even your lines will have no line, which though admirably Euclidean in concept, makes them rather pointless on screen or in print. It also makes the things almost impossible to find.

So, a better way is via a macro. The macro is the easy bit, as I took the coarse coder's approach of recording it then stripping out all the excess baggage. You can see the result in Fig 1: this applies the paragraph style 'Textbox', which I had previously defined, then removes any line and fill. With a degree of sophistication unusual in my macros, I've included an error-handling routine.

The next part is to get the macro where we need it. One good place is the Text Box toolbar. Note that this is a shy little fellow, and is only available from the View, Toolbars menu when you have a text box selected. From Tools, Customise, Commands scroll down the categories for Macros and then select the new macro from the list to the right.

Drag it onto the Text Box toolbar: you can then right-click on it to change the button name and/or icon.

An even better place for it, in my view, is the right-button or context menu for text boxes. With the Customise box open, click on the Toolbars tab and then tick the Shortcut Menus box. A toolbar with three menu headings appears – go to Draw, Shapes and the context menu will stay open, letting you go back to Customise, Commands, in order to drag your macro on to the context menu. Finally, on the issue of visibility, you can still see empty, unlined, unfilled text boxes by ticking Text Boundaries under Tools, Options, View.

PCW CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk



Measuring progress

Stephen Wells shows you how to use spreadsheets to gather data for assessment in education.

If my inbox is anything to go by, there's a growing interest among teachers to provide more information to parents on the progress of their children in school. The new buzzword is 'ipsative' assessment or measuring improvement against past achievement. Apparently some authorities view this as 'value added' like a manufactured product. Inevitably, assessment is bound to become more computerised, with fewer individual comments like 'could do better' and more tables and charts measuring progress numerically and graphically.

Many valuable personal qualities are impossible to quantify numerically. But let's review some of the tools that spreadsheets in general and Excel in particular can offer to help, with generalised examples that can be extrapolated by other professions.

Typically there will be a list, with records of pupils (the rows) and comparable information in fields (the columns), as in **screenshot 1**. We will name this whole block of cells from A13 to F28, FORM1. There are six fields and 15 records in our example. To see how the class is doing overall, you could use the

	A	B	C	D	E	F
13	PUPIL	MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
14	Anna	A	C	B	A	B
15	Caroline	B	A	B	C	D
16	Dave	B	B	A	C	B
17	Deborah	D	D	D	D	D
18	Liza	A	A	A	C	B
19	Lynda	B	A	A	B	B
20	Mike	C	A	B	C	B
21	Paul	B	A	A	B	B
22	Philip	A	A	B	B	B
23	Ronnie	B	A	A	B	B
24	Simon	C	B	A	A	C
25	Toby	B	A	A	B	B
26	Victoria	A	A	A	A	A
27	Warren	B	B	A	C	B
28	Xania	B	B	B		

SCREENSHOT 1: A SIMPLE DATABASE RECORDING THE RESULTS OF A SAMPLE OF STUDENTS IN FIVE SUBJECTS IN ONE EXAM

"MATH" including the quotes. Then type F1:F2 which is the criteria. Add a couple of commas to separate the arguments. Similarly, to count all the Bs earned in chemistry, in cell D7, enter =DCOUNTA(FORM1,"CHEM.",J3:J4).

You can quickly create a table, as shown in the block B1:D7 in **screenshot 2**, which shows the number of A and B results gained by the class in each subject.

■ Using AutoFilter

To quickly highlight the top students in the class, click on the row number 13

(say, five for an A, four for a B, two for a C, and one for a D) and then compare a student's progress between exams taken at the start of a term and at the end. You could even give a weighting to subjects – say 10 for Maths and English, and seven for Physics and Chemistry. So an A in Maths would be worth 50 points and a C in Physics, 14.

Set up a table as partially shown in **screenshot 4**. The weightings for each subject are in row 34. The ascribed values for each grade in B35:B38. The formula in cell C35 is =\$B35*\$C\$34 and you can drag that down to C38 (which will become =\$B38*\$C\$34). Below that, you can create a Lookup Table where ChemA is the label next to cell B40 which holds the reference G35, and the resulting value of 35 in this example. Name this Lookup Table, Values.

Copy the list of pupil's names into the range A63:A77. Copy the original six field names, Pupil to Chem into A62:G62. Then create a conversion table. Enter in cell B63 =\$B\$13&\$B14 (which will display MATHA in this example) and drag this down to B77 (which will display here MATHB). Now complete the table

SCREENSHOT 2: A TABLE OF THE NUMBER OF A AND B RESULTS GAINED IN EACH SUBJECT AND THE CRITERIA DATA NEEDED BY THE DCOUNTA FUNCTION

=DCOUNTA(FORM1,"CHEM.",J3:J4)

	B	C	D	E	F	G	H	I	J
1	Total				MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
2	A's	B's			A	A	A	A	A
3	MATH	4	8		MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
4	ENGLISH	9	4		B	B	B	B	B
5	FRENCH	9	5		MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
6	PHYSICS	3	6		C	C	C	C	C
7	CHEM.	1	11		MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
8					D	D	D	D	D

DCOUNTA function which counts all the specified non-blank cells in a database. First you need to set up a criteria table, which would look like the block F1:J8 in **screenshot 2**, for our example.

To count all the A results the class has gained in mathematics, enter =DCOUNTA(in C3. Then press function key F3 and pick the name FORM1. The second argument is a field so type in

and choose data, AutoFilter. Then click on the arrow that appears by each subject and choose the A option. If you want to find the students who gained an A in English and an A or B in the other subjects, choose the Custom option and fill out the dialog box as in **screenshot 3**. In the example given, there are six students who met this criteria.

You could give a value to each grade

Hints for Excel users

■ The F3 function key

This can be the most useful key in Excel. You can use it to insert a Name (or, with the Shift key, a function) into a formula. With Ctrl & F3 you can quickly define a Name; and with Ctrl & Shift & F3 you can define a row or column label as a Name.

■ Finding a worksheet

Somewhere on your hard drive is a worksheet and you can't remember which workbook it is in, let alone

which directory. You can't even remember its name. But you do recall that one cell had 'Victoria' in it. No problem. Right-click on Start and choose Find. Under Look In, choose C: (if that's your main hard drive). Click on the Advanced tab and the OfType down arrow. Choose Microsoft Excel Worksheet. In the Containing Text box enter Victoria. Click the Find Now button or press OK. When the file name appears in the

box below you can right-click and open it.

■ **To find something on a worksheet** press Shift & F5. This displays the same dialog box as using Ctrl & F.

■ **You can display** the available Names in a dialog box in Excel 97 and 2000 using Alt & F8.

■ **You can select** the current region around the active cell using Ctrl & Shift

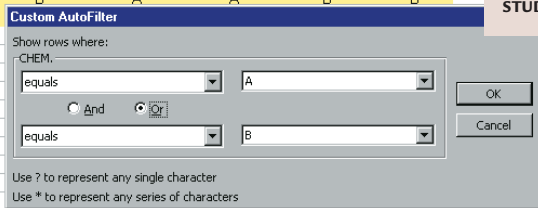
& 8 (which is Ctrl & *). The current region is any occupied area enclosed by blank rows and blank columns.

■ **You can jump** to the next occupied cell in a row or column using Ctrl & the arrow key.

■ **You can enter** the same thing in a range of cells by highlighting the range, typing in the contents and then pressing Ctrl & Enter.

	A	B	C	D	E	F
13	PUPIL	MATH	ENGLISH	FRENCH	PHYSICS	CHEM.
19	Lynda	B	A	A	B	B
21	Paul	B	A	A	B	B
22	Phillip	A	A	B	B	B
23	Ronnie	B	A	A	B	B
25	Toby	B	A	A	B	B
26	Victoria					

SCREENSHOT 3:
USING EXCEL'S
AUTOFILTER TO
HIGHLIGHT THE TOP
STUDENTS IN THE CLASS



term to another you could use frequency analysis. In its Analysis

as in screenshot 4, cells F101 to F105 will then show that six students scored in the range 171 to 200, five in the range 141 to 170, three in the range 101 to 140 and one scored less than 100. A number is counted in a particular bin if it is equal to or less than the bin number, down to the last bin mark. All values below the smallest bin value are counted together, as are the values above the largest bin mark.

Excel's Histogram tool can optionally provide outputs that are percentages and display as a chart.

out to cell F77. Now you can use the Lookup Table. Copy the fields again into row 80 and the pupils' names into the range A81 to A95. You can use the VLOOKUP function and enter in cell B81 =VLOOKUP (B63,Values,2,FALSE). This phrase means display the contents of column 2 in the Lookup Table named Values when the contents of cell B63 is found in column 1. The third argument, FALSE, means it has to be an exact match, not just the closest.

You could now create totals in column G. So cell G81 holds =SUM(B81:F81). This provides a total assessment (numerically, at least) for each student, based on your weightings in the table in A33:G38.

It is this total that could be used for comparison in tests at the start and end of a term.

■ Frequency analysis

To compare the results of tests from one

ToolPak, Excel provides a tool which shows the number of occurrences of a value in a data set.

Copy the pupils' names again and paste in A100:A114. Copy the assessment totals (from G81:G95) and, using Paste Special, paste the values into B100 to B114. Click any cell in this range, A100:B114 and choose Data, Sort by Column B, Ascending. In cells D101 to D104 enter the stepped

To compare the results of tests you could use frequency analysis

values 100, 140, 170, 200. Then

choose Tools, Data Analysis, Histogram.

In the resulting dialog box enter B100:B114 as the Input Range and D101:D104 as the Bin Range, and E101 for the Output Range. In this example of exam results from screenshot 1, weighted

	A	B	
33	Grade	Value	
34			
35	A	5	50
36	B	4	40
37	C	2	20
38	D	1	10
39			
40	ChemA	35	
41	ChemB	28	
42	ChemC	14	

SCREENSHOT 4: PART OF A TABLE THAT GIVES A NUMERICAL VALUE TO A GRADE, WEIGHTED BY SUBJECT

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

◆ Please do not send attached files unless they have been requested.

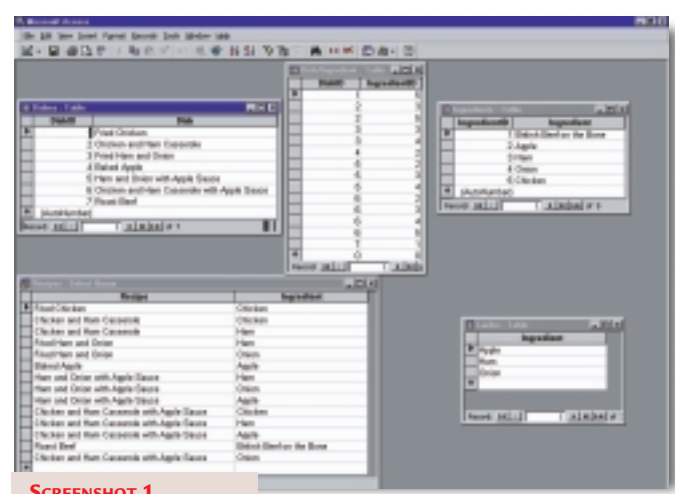


Ready, steady, database

Not even the **sacred contents** of Mark Whitehorn's larder are safe from his hungry database.

A very long time ago, when I had just started playing with databases, my charming wife Mary and I thought about creating a database which stored recipes, including the ingredients. The idea was that we would be able to input the contents of the larder and the database would list the possible dishes that could be produced. We were young, inexperienced and using (if memory serves) dBASE. We failed. Very occasionally since then the problem has surfaced briefly but I haven't pursued it. Now I don't have to because Ken Sheridan sent in a solution.

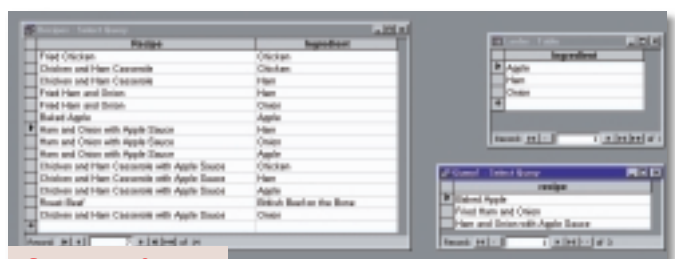
One of Mary's many skills is cooking (mine is simply eating) but you may not be interested in recipes. Fair enough, but you may be interested in selecting which engines can be built up from a given list of components, or which courses can be run, given a set of tutors with certain skill



SCREENSHOT 1
THE TABLE USED FOR COOKING UP THE RECIPES

and the information contained in them is redundantly summarised in the query called Recipes shown in the lower half of the screen. There is also another

base table called Larder which shows the food available. This table really ought to consist of a set of pointers to the table of



SCREENSHOT 2
SO, WE CAN FIND THE DISHES THAT CAN BE PREPARED, BUT 'HOW DO THEY DO THAT?'

sets. In other words, this class of solution is widely applicable.

Imagine that you have the tables set up as shown in **screenshot 1**. The top three contain the data about the recipes

ingredients, but making it so simply clutters up the screenshot even more, so I have sacrificed elegance of design for readability.

The SQL that Ken sent in (**Fig 1**) is deceptively simple and produces the results shown in **screenshot 2**. The result is correct: given Apple Ham and Onion

we can make Baked Apple, Fried Ham and Onion and Ham and Onion with Apple Sauce.

The intriguing question is, how is it working? Experience suggests that simply writing 'This is left as an

exercise for the reader' results in a great deal of mail; nevertheless I am of the opinion that you learn more about SQL from trying to work it out. So give it a try...and read on if necessary.

One way of working out how SQL is performing its

magic is to dissect the statement into parts and see how each bit functions alone. This usually doesn't work for all of the parts since they are designed to work together, but it is still a very useful technique.

```
The first part:  
SELECT R1.recipe FROM  
Recipes AS R1  
INNER JOIN Larder AS L1 ON  
R1.ingredient = L1.ingredient
```

```
Can be simplified slightly (if required) to:  
SELECT Recipes.Recipe FROM  
Recipes  
INNER JOIN Larder ON  
Recipes.Ingredient =  
Larder.Ingredient;
```

Either version returns this:

- Recipe
- Chicken and Ham Casserole
- Fried Ham and Onion
- Fried Ham and Onion
- Baked Apple
- Ham and Onion with Apple Sauce
- Ham and Onion with Apple Sauce
- Ham and Onion with Apple Sauce
- Chicken and Ham Casserole with Apple Sauce
- Chicken and Ham Casserole with Apple Sauce
- Chicken and Ham Casserole with Apple Sauce
- Chicken and Ham Casserole with Apple Sauce

Each dish appears once for each occurrence of one of its ingredients in the larder. By that I mean:

```
FIG 1  
SELECT R1.recipe FROM Recipes AS R1  
INNER JOIN Larder AS L1 ON R1.ingredient =  
L1.ingredient  
GROUP BY R1.recipe  
HAVING Count(R1.ingredient)=(SELECT  
COUNT(*)  
FROM Recipes As R2  
WHERE R2.recipe = R1.recipe);  
(Key: ✓ code string continues)
```

FIG 2

```
SELECT R1.recipe
FROM Recipes AS R1
LEFT OUTER JOIN Larder AS L1 ON ✓
R1.ingredient = L1.ingredient
GROUP BY R1.recipe
HAVING COUNT(R1.ingredient) = (SELECT ✓
COUNT(ingredient) FROM Larder)
AND COUNT(L1.ingredient) = (SELECT ✓
COUNT(ingredient) FROM Larder);
(Key: ✓ code string continues)
```

Fried Ham and Onion appears twice because the recipe requires both Ham and Onion and both are in the larder.

Baked Apple appears once because the sole ingredient is in the larder.

Chicken and Ham Casserole appears once because one of the two ingredients is in the larder.

Roast Beef doesn't appear because the ingredient is not in the larder.

In other words, this part of the query finds all of the dishes which have one or more ingredients in the larder.

The next part of the SQL applies a GroupBy

```
SELECT Recipes.Recipe
FROM Recipes
INNER JOIN Larder ON ✓
Recipes.Ingredient = ✓
Larder.Ingredient
GROUP BY Recipes.recipe
```

This produces:

- Recipe
- Baked Apple
- Chicken and Ham Casserole
- Chicken and Ham Casserole with Apple Sauce
- Fried Ham and Onion
- Ham and Onion with Apple Sauce

This simply ensures that each of the selected recipes is shown only once. So, we now have the name of each recipe that uses one or more of the ingredients

in the larder. The trouble is that we can't actually make all of these dishes. We don't, for example, have any chicken; so attempts to produce Chicken and Ham Casserole are doomed.

We need to reduce this list still

further. How can we ensure that each dish has not only some of the required ingredients, but all? Well, consider this variation on the query above.

```
SELECT Recipes.Recipe, ✓
Count(Recipes.Ingredient) ✓
AS CountOfIngredient
FROM Recipes
INNER JOIN Larder ON ✓
Recipes.Ingredient = ✓
Larder.Ingredient
GROUP BY Recipes.Recipe;
```

All I have added is a count of the ingredients for each dish which are currently in the larder. The answer table looks like this:

Recipe	CountOfIngredient
Baked Apple	1
Chicken and Ham Casserole	2
Chicken and Ham Casserole with Apple Sauce	4
Fried Chicken	1
Fried Ham and Onion	2
Ham and Onion with Apple Sauce	3
Roast Beef	1

Now, it so happens that we can also find out how many ingredients are required for each dish.

```
SELECT Recipe, ✓
Count(Ingredient) AS ✓
```

```
CountOfIngredient
FROM Recipes
GROUP BY Recipe;
```

Recipe	CountOfIngredient
Baked Apple	1
Chicken and Ham Casserole	1
Chicken and Ham Casserole with Apple Sauce	3
Fried Ham and Onion	2
Ham and Onion with Apple Sauce	3

Ah ha! Given the two tables above you can see where this is going. If we take from the list of recipes in the first table only those where the CountOfIngredients matches the value in the second table, we have the list of dishes that can be prepared. So, Baked Apple needs one ingredient, and there is one in the larder, so we can build that dish. The casserole is a no no because we have only one ingredient and need two.

Ken's SQL statement wraps all of this up into one elegant statement. As a further variation he adds: 'A variation on it would be to use exact division, ie returning only recipes where the ingredients exactly match those in the larder, Ham and Onion with Apple Sauce in the above case.'

The intrepid among you can try to work it out. The solution is as shown in Fig 2 above.

■ **What's in a name?**

Hiram Morgan writes to ask if, when you have a column with two forenames in some of the First Name fields, eg Mark John, is there a criterion to select the records containing the double names?

The answer is to use Like "*" as the criterion, as shown in screenshot 3.

■ **Access nulls**

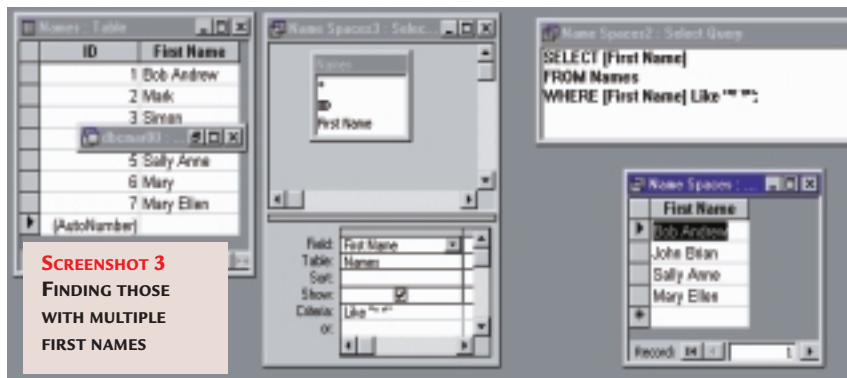
Finally, on the subject of finding nulls in Access, several people have pointed out that Access has an equivalent function to Oracle's NVL(), which is Nz().

Interestingly this doesn't appear in earlier versions of Access, for example Access 2.0, but had appeared by 97. Anyone know about 95?

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email: database@pcw.co.uk

The MDB file for this and previous months' columns can be found at www.penguinsoft.co.uk



SCREENSHOT 3
 FINDING THOSE WITH MULTIPLE FIRST NAMES



Picking your pixels

Gordon Laing **resolves resolutions** between your digital camera and output hardware.

There's always a period of overlap - between dumping one technology and adopting another, that is. But you know the signs when the older system is on the way out. I never thought I'd tire of my beloved LaserDisc collection, but today they simply look terrible compared to most DVDs. The only reason my LD player remains on the equipment rack is because of pesky George Lucas. Yes, the man who tempted me to adopt the format in the first place with the *Star Wars* Definitive Collection box set, now forces me to keep it on thanks to the fact we're unlikely to see DVDs of these movies any time soon. But the instant they arrive (and a load of Amblin/Universal stuff too), I'll be 100 per cent DVD. I can't wait.

The same thing's happening with me and digital cameras. Always a fan of photography and gadgetry, these little devices should really have won me over some time ago. However, it's only just recently they've begun to offer the kind of facilities and quality that would make me consider abandoning film for all but the most specialised applications.

This month's *Hardware* takes a closer

look at a few of the finer details of digital cameras for the real photo enthusiasts out there. What to look out for, what it all means, and does any of it make a difference at the end of the day.

Before going any further, I'll just finish this train of thought by saying my days of using APS for snapping are truly numbered. A fortnight ago I had a very pleasant weekend away and took two and a half rolls of 40-exposure APS. It's taken me this long to get round to processing them at my preferred lab, not to mention scanning them for my website.

Oh, and half a roll is still in the camera. The one thing people rarely mention about digital cameras is that you can take just one picture if you want, and still get at it. And the killer fact? That the last few two-megapixel digital cameras I've used offer greater control and produce far better quality prints (with an Epson Stylus Photo printer) than I get from my Canon Ixus APS and favourite lab. Definitely time for a change.

■ Resolution

Back in November we looked at scanning tips in this column and described what kind of resolutions were suitable for

which applications. Exactly the same rules apply to digital cameras, but the numbers are often described differently.

Normally a scanner's resolution is described as a matrix of dots per inch (dpi), say, 600 x 600dpi. That's 360,000 dots in every square inch. As these dots can capture any colour from a 24bit (or higher) palette, it's often fairer to describe them as pixels. This eliminates confusion when comparing specifications with printer dots, that normally can only be one of a few 10 or 100 colours.

A digital camera comes at resolutions the other way around from scanners, and is normally described as having, say, 1.3 or 2.1 megapixel resolution (at least they don't call them mega-dots). Working backwards, this results in an imaging CCD with a matrix of 1,280 x 1,024 or 1,600 x 1,200 pixels respectively.

Now these full-colour pixels are effectively the same as those captured by scanners with the same rules for printing. Generally, most colour inkjet printers are perfectly happy being fed image files with around 200 pixels per inch (ppi). This is however very much down to personal preference and hardware capability, with some printers unable to improve on more



ENLARGED PORTIONS OF A POST BOX TAKEN WITH THE KODAK DC290 CAMERA; IF THE FULL IMAGE WAS SHOWN, IT WOULD FILL THE PAGE.

LEFT: OPTICAL RESOLUTION OF 1,792 x 1,200 PIXELS AND HIGHEST-QUALITY JPEG SETTING; THE PRINTED RESOLUTION HERE IS 195PPi.

MIDDLE: INTERPOLATED RESOLUTION OF 2,240 x 1,500 PIXELS AND

HIGHEST JPEG QUALITY; PRINTED RESOLUTION HERE OF 230PPi.

RIGHT: OPTICAL RESOLUTION OF 1,792 x 1,200 PIXELS AND SAVED AS RAW TIFF FILE; PRINTED RESOLUTION HERE OF 195PPi. NOTE THE TEXT WAS SLIGHTLY OUT OF FOCUS SO THE INTERPOLATION DOESN'T OFFER ANY PARTICULAR BENEFIT, CONSIDERING ITS FILE SIZE WAS BIGGER.

than 150ppi, and some photographers demanding files of 300ppi.

Either way, you can work out what size prints your camera can produce. Take a 2.1 megapixel camera with 1,600 x 1,200 pixel resolution. Printing at 200ppi would result in a picture measuring 8 x 6in. At the same printing resolution, a 1.3 megapixel camera would be good for just over 6 x 5in output. Reducing the printing resolution to 150ppi would produce output around 10 x 8in or 8 x 7in for 2.1 and 1.3 megapixel cameras respectively.

Clearly a higher-resolution camera means bigger prints, or the ability to pick out portions without too much loss in quality. It's an easy numbers game to play, so manufacturers are using it. While most of the current crop boast 2.1 megapixel resolution, Fuji squeezes a little more quality by using 1,800 x 200 2.3 megapixel CCDs. It's not a massive difference, and it looks like consumers may be stuck at this level for some time.

Over a year ago, a Nikon spokesperson at Comdex said 2.1 megapixel resolution was sufficient for consumers as they could produce decent quality A4 colour inkjet prints – since most people are happy with 5 x 7in prints from labs and only use 10 x 8in for rare enlargements, it's probably a fair comment. I've personally seen Fuji's 2.3 megapixel cameras pushed to A3 colour inkjet output, and the results look pretty good.

So is 2.3 megapixel as far as consumer resolution is going to go? I had a word with a salesperson from Fuji who mentioned its next consumer development would be to use CCDs with better colour response. I can't confirm, but I guess that these could be the new Kodak chips with far-improved blue response that astronomers are currently so excited about using for their digital imaging. Such chips would allow the cameras not to compensate so highly, with the result of more realistic images and better performance in low light.

Interestingly, I also talked to a spokesperson from Nikon recently about the modest 2.74 megapixel resolution of its D1 professional digital camera. He argued it was more than adequate for typical photojournalist users, and that if it was any higher and they'd have difficulty getting images back to the office.

■ Interpolation

Scanner manufacturers play an interesting numbers game with



ENLARGED PORTIONS OF A TREE PHOTOGRAPHED WITH THE KODAK DC290 CAMERA AT ITS OPTICAL RESOLUTION OF 1,792 x 1,200 PIXELS AND REPRODUCED HERE AT 180PPI; IF THE FULL IMAGE WERE SHOWN IT WOULD FILL THE PAGE. THE LEFT-HAND IMAGE IS TAKEN WITH THE HIGHEST-QUALITY COMPRESSION, RESULTING IN A 911KB JPEG IMAGE. THE IMAGE ON THE RIGHT IS TAKEN WITH THE HEAVIEST



COMPRESSION, RESULTING IN A 196KB JPEG. NOTE THAT THE ORIGINAL UNCOMPRESSED IMAGE WOULD HAVE MEASURED 6.16MB, SO BOTH SETTINGS HAVE DONE A GOOD JOB. NOTE, HOWEVER, THAT THE HEAVIER COMPRESSION HAS RESULTED IN BLURRING AND SOME PATCHY AREAS, PARTICULARLY WHERE THE TREE TOUCHED THE SKY. LOOKING CAREFULLY, THE IMAGE HAS ALSO SPLIT UP INTO MANY SMALL BLOCKS

interpolation. The optical resolution refers to the actual resolving power of the CCD and the limiting amount of detail than can be captured. However, if you compare two dots side by side and see that one is yellow and the other is red, it may be fair to insert an orange one in between. This is interpolation and, when done well, will increase the apparent resolution, and smooth some edges, although not actually create detail that wasn't there in the first place.

Digital camera manufacturers have now realised interpolation could make their resolutions seem bigger than they really are. Epson and Agfa were early pioneers of this technique on cameras, and now Kodak is boasting a 3.3 megapixel camera. Its DC290 is in fact a 2.1 megapixel model with 1,792 x 1,200 pixel resolution, but with a bit of internal calculation it'll produce 2,240 x 1,500 pixel images.

We photographed a pillarbox at 3.3 megapixel (interpolated), then 2.1 megapixel (optical) resolution both using the highest quality JPEG compression offered. For reference, we also photographed it as a RAW uncompressed TIFF file. We've enlarged

the same portion of all three images to see if the interpolated one really looks any better than the optical – remember, it's occupying more file space.

■ Compression

Of course, high resolutions are all very well, but the more pixels you capture, the more memory you'll need to store them. Today, most digital cameras use expensive flash memory cards, that cost around £45 for 16MB. A single 2.1 megapixel 24bit colour image measures over 6MB in size. Most digital cameras are sold with four to 20MB of flash memory – you do the maths.

Unless you're happy with getting one or two images per card, you're going to need to use some kind of compression. JPEG is the favoured technique, and most digital cameras offer it in varying levels of quality. The better they look, the more space they occupy, so it's up to you to find a balance; fortunately you can chop and change resolution and compression settings on the same card.

As our example images show, a little JPEG compression produces results indistinguishable from the real thing, with plenty of memory saved. However,



Latest news on dual-Celeron systems

Back in January's issue I described how to build a cheap dual-processor system using an Abit BP6 motherboard and a pair of Intel Celerons. Many thanks to everyone who has written in to comment, especially those who've actually built their own and resolved my overheating problems!

Stuart Booth recommended I invested in a tube of Heat Transfer Compound to spread in between my chips and heatsinks – it's done wonders for his 366s overclocked to 572MHz each using a 104MHz FSB. He's a software developer and describes his dual-Celeron system as absolutely worth its weight in gold: 'When using a single-processor machine, the C++ compiler sucks up 100 per cent CPU usage, effectively rendering it useless as the entire UI becomes frustratingly slow. On the dual-processor machine, you can carry on working while



OVERCLOCKED CHIPSETS GET WARM TOO. FOR INCREASED RELIABILITY YOU MAY WANT TO ATTACH A 486 FAN TO THE BX CHIPSET'S GREEN HEATSINK

doing a build in the background, or compile in half the time using two instances of MSDevStudio.'

Fraser Glass also suggested I looked into the thermal paste, and put me onto a trick he found on a site dedicated to the Abit BP6. At (www.bp6.com/bx/) the writers describe how the poor old BX chipset can get a bit warm when running a pair of overclocked processors. I investigated their solution further.

One visit to Maplin later and I'd bought a tube of heat transfer compound for £1.99

and a 486 heatsink and fan (part LX51) for £5.99. I removed the BX chipset's green heatsink (sadly having to remove the motherboard first), applied a very thin layer of paste (thinner is better), then popped the heatsink back. I separated the 486 fan from its heatsink, and screwed it into the top of the existing BX heatsink – a perfect fit!

I also removed the thermal pad from my upgraded CPU heatsinks and applied a thin layer of paste instead. Previously my CPUs ran at 39°C when normally clocked,

or a frightening 48°C when overclocked. I'm now pleased to report that both stay between 38 and 41°C when overclocked even after processing for over 24 hours.

One final snippet: Wilfred of 'hardware-one' has it from a reliable source that Abit is working on a BIOS update and physical socket adaptor that will allow the BP6 motherboard to use FC-PGA socketed Pentium IIIs after all. Fingers crossed! www.bp6.com www.hardware-one.com www.overclockers.co.uk www.maplin.co.uk

turn up the compression and the cracks begin to show. Notice how sharp edges are blotchy and smooth gradients can become stepped. Again it pays to experiment, particularly with your desired output device. A high-quality printer may reveal the poor results immediately. Then again, a cheaper inkjet could gloss over the results of high compression, or you may have wanted the image as small as possible for use online anyway.

Ironically, after citing the long life and reliability benefits of solid state memory, we're beginning to see a return to conventional spinning disks on digital cameras. IBM has produced a 340MB hard disk in the CompactFlash II form factor that should work in any camera with a suitable CF II slot – Kodak, Nikon and Canon favour CF, and the latter even offers a smaller CF hard disk with its ageing PowerShot Pro70 camera. Iomega too is pitching its 40MB Clik media for portable devices, and it has already fitted

one in Agfa's ePhoto CL30 1.5 megapixel digital camera. Iomega also hopes to see it used in future MP3 players, although to get a whole album on a disk you'll need to use low rates of around 96Kbits/sec.

■ Connection

Bigger images, even when compressed, mean longer download times. It still pains me to see new digital cameras released without fast USB interfaces. Kodak has been fitting USB for ages, but it's taking everyone else a long time to follow suit. Sure, you can buy a USB card reader or floppy adaptor for around £50 which doesn't need your camera or its batteries to be present and correct, but that's not the point. Check the numbers: USB transfers images around 10 times faster than traditional serial. High-quality 2.1 megapixel JPEG images on a Kodak DC290 took as long as a minute to transfer over serial, compared to three to seven seconds on USB. An uncompressed

6MB TIFF took 50 seconds over USB and we gave up over serial.

Alternatively, check out Lexar Media's USB-enabled CF memory cards. These come with USB cables which connect directly to the card, ready to squirt images to your PC or Mac – neat stuff.

■ The whole picture

We've pushed digital cameras to their limits in this article, but it shows how far they've grown in a matter of months that we can fairly compare them to their film counterparts in terms of quality and features. Now we can sit back and wait for the prices to drop.

PCW CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office or email: hardware@pcw.co.uk



Holding back the ears

Steven Helstrip looks at ways of **avoiding that sound delay** between your PC and your speakers.

If you have ever plugged a guitar or microphone into your sound card to try out a handful of plug-in effects, you'll no doubt be aware of the effects of audio latency.

Essentially, latency is the time delay between audio entering your PC and emerging from your speakers once all the processing has taken place. In a typical system with standard MME sound card drivers, these delays can amount to 800ms or more. As you can imagine, it's just about impossible to play or sing in time when your monitor signal is almost a whole second behind.

A similar delay is found with software synthesisers: when you press a key on your keyboard, an age can seem to pass before anything is heard. Although many software synths and effects claim to work in real time, with some PC set-ups, nothing could be further from the truth.

The whole subject of latency has only become an issue for musicians over the past few years. Before PCs could handle multiple audio tracks and 'real-time' effects, the only alternative was to invest in expensive, dedicated hardware.

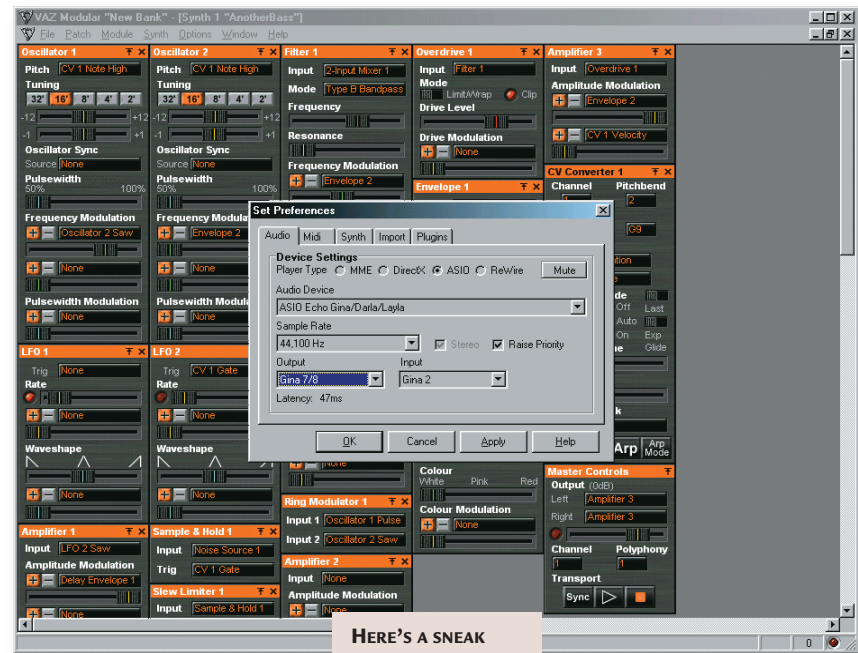
However, now that the virtual, software-driven studio has become a reality, latency seems to be causing more than its fair share of frustration.

■ What causes latency?

Latency is brought about by a number of factors that can vary from system to system, depending on your sound card, its drivers and the way your audio software is configured. In a typical example, such as listening to software effects with a microphone, sound first has to pass through your sound card's analog-to-digital converters and find its way to the card's driver software. From here the sound data waits in a buffer until the operating system has a moment to deal with it. It's at this point that most of the delay is introduced, since the OS is always busy juggling other tasks.

Once the data is in the hands of the

Latency seems to be causing more than its fair share of frustration



HERE'S A SNEAK PREVIEW OF VAZ MODULAR USING STEINBERG'S ASIO DRIVERS

operating system, it needs to pass through several layers of code before reaching the software that will apply the effect. The effects algorithm will introduce a further delay while it chews up the data before passing it back to the operating system. After working its way through more buffers, queues and layers of code, sound eventually emerges from the sound card's digital-to-analog converters. When applying effects to

audio from disc, or playing a software synth, these delays can be reduced

by as much as a half, as there are fewer queues for sound data to get held up in.

■ Working to speed things up

Microsoft's attempt to reduce latency (among other things) was to write a set of optimised drivers, called DirectX. These drivers basically provide lower-level access to hardware, bypassing several layers of the operating system. Although this work was originally intended for games developers, most audio programs – particularly software synths – support

DirectX for this very reason.

Unlike MME drivers, DirectX enables two or more programs to use the same sound card simultaneously. However, DirectX is still far from ideal for music production since it only supports audio playback and not record. So it's not much use for audio sequencing work, unless, of course, you only switch to the DirectX drivers once all your parts have been recorded.

The best solution so far has been Steinberg's ASIO (Audio System Input/Output) 2.0 drivers. ASIO cuts latency by bypassing the operating system altogether, effectively providing direct access and control of audio hardware. As well as being able to record and play audio, ASIO provides zero-latency hardware monitoring and allows multiple programs to share a single card. At present, though, I only know of four programs that support ASIO. These are Cubase VST, Emagic Logic, VAZ Modular and Retro AS-1.

Another drawback of ASIO is that each sound card requires a unique driver. Although many high-end cards now come with ASIO drivers, the majority still don't. Some sound cards have it all, though. Terratec's EWS88MT and



Software drum machines are upping the tempo

After much anticipation, Steinberg's LM-4 has finally arrived. For those who missed January's column, LM-4 is a virtual drum machine for the VST 2.0 plug-in format. What's so special about that? Well, it's the start of something big – a new way to make music with your PC.

Although there are already a handful of software drum machines, this one has its outputs connected straight into VST mixer channels, enabling EQ and effects to be applied to individual sounds.

And because VST 2.0 instruments have full MIDI implementation, drums can be played real time (latency permitting), all from within the same program.

LM-4 comes equipped with 20 drum kits, each comprising at least 18 drum sounds. Some of the better kits, however, have velocity-layered samples to add greater realism. So, when you lightly tap the ride cymbal key on your synth, a lightly played ride cymbal is what you'll hear. Give it a good thwack though and the ride will ring out more

like a crash. Surprisingly, the kits on offer are not particularly dance orientated. Aside from a couple of electro-style kits and one for drum and bass, the remainder is a selection of live kits for pop, rock, jazz and R&B.

The first thing I tried with LM-4 was to play back a selection of live-played drum patterns. The quality really was something to get excited about, particularly when I started to play around with some EQ and reverb. LM-4 provides six outputs (one stereo and four mono) and all sounds are freely assignable. Other parameters include volume, pitch and velocity sensitivity.

■ Rock 'n' roll

Once you have your MIDI tracks in place, LM-4's playback is rock solid. However, I did find that



STEINBERG'S LM-4 IN ACTION WITH A FULL COMPLIMENT OF EFFECTS

unlooping, say, an eight-bar section would cause LM-4's playback to be muted. To get the sounds back, you have to stop and restart playback. Creating your own drum kits is another area that needs attention.

At present, you are required to write script files and save your samples to special folders. Even after following the instructions several times, I still had no idea how to do this and still don't. My solution was to overwrite some of the more obscure

drum sounds that came in the box.

Should you buy it? Apart from a few shady areas, LM-4 is excellent value at £99 (inc VAT). Its sound quality is excellent (much better than playing the same instruments as a SoundFont) and you gain all those extra outputs for mixing. If these kinds of features get you excited, then I wouldn't hesitate.

Event's Gina ship with ASIO, MME and DirectX drivers. To illustrate the difference ASIO and DirectX drivers make, I'll use the Gina as an example.

When using the MME driver at 44.1KHz, Cubase VST reports a latency of 557ms. Switching to the

DirectX driver reduces this to 204ms. When the ASIO driver is selected, the card's latency drops to just 25ms. Terratec's EWS88MT on the other hand, manages just 8ms when set to the same

sampling rate. Increase this to 96KHz though, and it drops to a staggering 3ms. Now that's more like it.

With the recent release of version 9, Cakewalk now incorporates a new

WavePipe driver that is claimed to reduce latency by as much as 80 per cent.

Although we

haven't tried it out for ourselves yet, Et Cetera Distribution claims it is 10 per cent quicker than ASIO and simply requires standard MME drivers to work.

Other sources report that WavePipe is

greatly dependent upon the quality of the MME drivers it is working with. This means that if your drivers aren't very good, then WavePipe can't work its magic. Also, unlike ASIO, there are no plans yet to release an SDK so other software developers can use the technology.

PCW CONTACTS

Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk

LM-4 costs £99 (£84.25 ex VAT) and is available from Arbiter on 020 8970 1909



Preflighting publications

Ken McMahon offers a foolproof guide to ensuring a smooth print run using the preflight approach.

Rinkjet colour printers are great for printing short-run colour documents such as stationery, in-house newsletters and invitations, but when you need more than a few copies often the only cost-effective answer is commercial printing. Even for professional designers handing over a colour job to a commercial printer is something of a gamble. There's just so much that can go wrong.

The process of ensuring your commercial colour print job doesn't turn out to be a costly mistake is called preflighting. Before departure, pilots check over their aircraft to make sure there are no faults that would result in mid-air disaster. Failing to perform a similar routine on your artwork can also have catastrophic results.

A number of products have appeared that make the preflight routine quick and simple and highlight problems that might be missed by the naked eye. The two most commonly used are Extensis Preflight Pro (www.extensis.com) and Markzware's Flightcheck, (www.markzware.com) both of which work on Quark Xpress, PageMaker, and Illustrator documents among others. Preflight Pro 2.1 is a Mac OS only product, whereas Flightcheck 3.6.1 is also available for Windows.

Preflight programs analyse your document page by page and then produce a report of possible problems. You can then go back into the document, put things right and run the check again, repeating this process until you're satisfied everything's OK.

For those who regularly produce four-colour artwork for commercial printing, preflight software is a worthwhile investment. But for occasional jobs and users of unsupported layout applications it's the hands-on method. Most colour production disasters can be avoided using a simple checklist prior to copying the files to disk and sending them to the printer. Here I've detailed the most common pitfalls. Inevitably you learn from (mostly bad) experience, so it



THESE PREFLIGHT CHECKS COME WITH IN-FLIGHT SOLUTIONS – A REAL BONUS

always pays to develop a good relationship with the printer – their knowledge may help you avoid an expensive mistake before it happens.

1 What happened to the colour?

Most colour output problems are a result of an error in the specification of CMYK process colours and spot (Pantone) colours. Typically, spot colours may be defined as CMYK and vice versa, in either case colours won't print as you expect, either because a CMYK colour appears on an additional spot colour plate, or a single spot colour is split into its CMYK constituents.

Check all the colours in your document to make sure they are correctly specified. If your document contains .eps graphics – say, from CorelDraw or Illustrator – you will also need to open and check these. Spot colours must be named in exactly the same way in the draw application as in your layout application, or you will end up with two different colours. An easy way to check that you've got everything right is to print the separations to a mono laser printer, checking that everything is on the right plate and that you have the right number of separations.

2 I can't read that coloured text

Take a quick look through your document and make sure there is no small type (less than 9pt) or thin rules made up from CMYK process colours. CMYK colours are screened to produce the percentage tints that make them up and small type and thin rules will break up and look fuzzy. Even slight misregistration of the plates on the press will exaggerate this with horrible results.

3 My colour pictures are in black and white

RGB images will, in most circumstances, print as a greyscale on the black plate. The only way around this is to open and check all your pictures in an image editor and convert them to CMYK if they are RGB. If there are a lot of pics, a random check on some may be sufficient. Alternatively, if your image editor has good scripting features you could write a script to open a folder of pics and convert them all to CMYK.

4 My duotones look muddy and horrible

You have set the second duotone colour to print with the same screen angle as the first, so the second colour dots have been printed directly on top of the first colour dots.

Questions

& answers

Q I read your article on 'Stitching' with interest. I would like to try this and would be interested to know if there are other programs which will perform 'stitching' as Corel Paint 9 is expensive to be used

for just that one feature.

EDDIE

DUKE3D1997@AOL.COM

a Yes there are, try *PhotoDeluxe Home edition 3 (£35)*, *MGI PhotoSuite 3 ((£42.55)* or *Ulead PhotoExpress (£37.50)*

Q I have seen adverts in a US magazine

for a program called Canvas. I believe it is currently in version 6, and is created by a company called Deneba. From the way the company advertises the product, it would seem that Canvas can do everything that Photoshop, Illustrator and Quark Xpress are able to do, and more, all in one box. I would be interested in anything you could

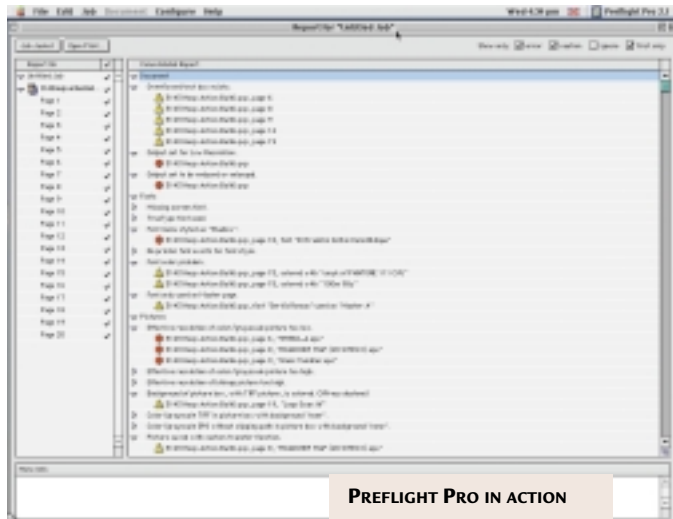
tell me about this product.

MIKE GRIMSHAW

a *Canvas does indeed combine vector graphics, bitmap 'sprite' effects, typography and layout in one package. Version 7, which is just out for Windows and Mac OS, introduces sprite layers and lens effects. There is a demo at www.deneba.com.*

5 My pictures look bitty and broken up

There are three possibilities here. The first is the resolution is too low. As a general rule, your scans need to be twice the pixel resolution of the line screen. Typically, printing with a 150-line screen means your scans should be 300dpi at the output size. The second possibility is the picture file is missing and the low-resolution preview image has been used in its absence. Lastly, .eps bitmaps placed in Quark picture boxes with no background colour may appear jagged along contrasting edges. The solution to this is to change the background to white.



PREFLIGHT PRO IN ACTION
 LISTS POSSIBLE PITFALLS IN YOUR DOCUMENTS, HELPING YOU AVOID COSTLY MISTAKES

view' ie as you would read them in the finished document, but a printer needs them arranged so the printed sheets when folded, trimmed and stitched together, appear in the correct place. This process is called imposition. With large documents it can be a complicated arrangement, but at it's simplest it means that in, say, an eight-page document the pairings are pages 8 and 1, 2 and 7, 6 and 3 and 4 and 5. You don't necessarily have to do this yourself as the printer can carry it out, but supply a stapled together 'dummy' of your document that shows the page layout.

As a rule, your scans need to be twice the pixel resolution of the line screen

This list doesn't by any means cover everything. But you can protect yourself against disaster by adequate proofing. First proof your document on a mono

printer and print separated colour plates. Then produce digital colour proofs on a calibrated colour inkjet. Your last chance is to carefully check over the film and produce Cromalin or Matchprint proofs from all, or at least some sample spreads.

You can get the printer to produce 'wet' proofs on press using the paper your document will be printed on. This last option is the most accurate, but it's also expensive and, should things not be right, costly to change as new film and plates will be required. You don't, of course, need to take out all these insurance

policies, any one of them, in addition to the first, should cover you.

Lastly, when you supply the job to your printer make sure to pass on as much information as possible, even if this

has previously been supplied for an estimate. If you've

carried out a thorough preflight, obtained proofs and provided your printer with all the details, you can look forward to a trouble-free production.

PCW CONTACTS

Ken McMahon welcomes your feedback on the Graphics & DTP column. Contact him via the PCW editorial office, or email graphics@pcw.co.uk Flightcheck 3.6.1 is available from Xchange International on 020 7588 5588

6 Bitmapped fonts

Type 1 postscript fonts require the PostScript 'printer' font to be present at output as well as the screen font used for display.

7 Fonts do not appear as expected

Type 1 fonts that have had a style applied may not print as expected, depending on the availability of printer fonts. For example, if using a font with a variety of weights and you bolden a roman face from the style menu it's a toss up as to whether you'll get medium, book, bold or extra bold. The solution is always to use the menu font. A font menu utility such as Adobe Type Reunion or Extensis MenuFonts which comes with Suitcase will make this easier.

8 My pages are in the wrong order

Most people lay out their spreads 'to



Waiting for the web

It's still **dimensionally challenged**, but Benjamin Woolley finds moves afoot to give the web depth.

Many readers may have had their fill of ecommerce coverage, so let me first reassure you that this month's column is not going to deliver more. However, last Christmas was notable for showing how an Internet innovation hovering in the realm of conjecture can, in a very short space of time, become reality.

Presumably, those who are still working feverishly on 3D for the web are hoping the same thing will one day happen in their arena. Thus far they have had to be very patient.

There was once a hope that ecommerce would itself help 3D gain a foothold, as the most commonly suggested application for the technology is providing three-dimensional models of objects in online catalogues. But few online stores have yet chosen to offer such a facility.

■ So is 3D destined to remain the Cinderella of online media?

One of the keys to a breakthrough inevitably concerns standards. VRML, proposed as the 3D or 'virtual reality' equivalent of HTML, provided a start, but it has remained isolated from the multimedia mainstream. You can bet that for most, their Flash and RealPlayer browser plug-ins see a lot more action than their VRML browser plug-in.

However, there is a change on the

AN ISLAND WORLD AS RENDERED USING THE 'ISLANDS' CLIENT FROM PARALLEL GRAPHICS



horizon that could have a big influence: the introduction of the MPEG4 standard.

In the software world, developers are never that good at doing things in sequence. Thus Windows 95 follows 3.1, and MPEG 4 follows 2 (and will in turn be followed by 7 - you can find out about the standards, and their odd version numbering, at the rather overloaded home page of the MPEG Standards Committee, which is at drogo.cselt.stet.it/mpeg/).

MPEG4 includes a 'scene description language' as part of the standard, which theoretically means 3D content will be seamlessly integrated with the other multimedia capabilities (2D graphics, animation, video and sound) of the standard. This could provide a

considerable enhancement for 3D, but not for some time. (You can find an interesting and useful article about

MPEG4 on the web at drogo.cselt.it/mpeg/koenen/mpeg-4.htm).

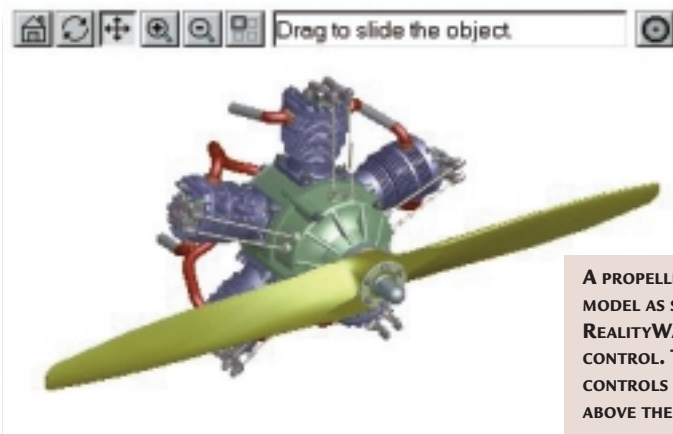
Meanwhile, VRML content continues to appear, but mostly on an experimental basis. A lot of it is connected with the development of particular viewers or types of client software. These can be used to view models and scenes that are in some way 'enhanced'. For example, Parallel Graphics (www.parallelgraphics.com/htm/en/), one of the most active developers in the field, offers two sorts of clients, 'Cortona' and 'Islands' (above is a scene developed for the latter).

Cortona is a client that supports advanced 3D technologies such as NURBS, while Islands is designed to allow users to interact with each other and the world they are in, a VRML version of the proprietary Activeworlds (www.activeworlds.com), which I have explored in previous columns.

The other main area of activity in the development of 3D content over the web is 'streaming', that allows models and textures to be viewed and manipulated as they are being downloaded.

Metastream from Metacreation is one of the most successful examples of streaming I have tried, and does seem to be attracting serious content providers.

At the time I checked out the site



A PROPELLER AND ENGINE MODEL AS SEEN USING THE REALITYWAVE ACTIVE X CONTROL. THE NAVIGATION CONTROLS ARE ARRANGED ABOVE THE MODEL

Dealing with the professionals

Following my September, 1999 column about post-producing 3D animations, I got a long and stimulating email from Steve Street, a pro who says he has worked for 'many years' in the field of 3D effects and animation. I thought I would pass on some of his views to provide a professional perspective on an often neglected aspect of 3D authoring.

To begin with he took issue with my assertion that 'post-production is about adding 2D effects to your 3D scenes'. It is, he argued, a lot more than that. In the professional realm at least, shadows, extra lighting, depth cue effects such as fog and haze, reflections and

refractions (distortions produced by transparent materials) are often added after the 'final' render.

He also disagreed with my suggestion that by adding certain effects or 'video artefacts' such as lens flare you could make a CG animation look more like video. 'It wouldn't really make much sense to start blurring sequences and adding lens flares because VHS required these in order to look "natural",' he wrote.

'This misconception probably leads many people down the wrong track - rushing out renders and applying layer after layer of "cheesy" lens effects rather than spending time making an animation look good in

the first place. Often these flare and glow effects will be hiding the only good parts of the animations themselves.'

This was Steve's advice for getting decent results when transferring animations to VHS: 'You have to consider the limitations of the format, such as colour saturation and brightness. VHS in particular is bad with reds, so having a red background as a backdrop to your 3D would be the kiss of death for VHS and even digital formats to a certain extent. Other solid colours would be better. Then there are issues over what could be useful properties of video in certain cases - such as being

able to render images interlaced for smoother motion - helping to avoid jitteriness of fine lines on the move.'

For budding professionals, he advised approaching a post-production house and asking if it might think of letting you use a bit of its 'downtime' (ie time when the hardware isn't booked for paid work) to transfer your masterpiece onto video. This is obviously easier in London than, say, Lerwick, but if there's a company that's accessible, you might as well ask.

Just make sure you check in advance which file formats and media formats are accepted,' Steve advised.

(www.metastream.com) there were links to CBS (http://marketing.cbs.com/mini/joandarc/ja_02--history_3dmetastream_n3not.html) and Lego (www.legomindstorms.com) that made good use of the technology.

There are alternatives vying for a place on the web, some of them working as plug-ins for Realplayer G2. Fluid3D is one of these, although clearly still in development. The website (www.oz.com/fluid3D) promised untold marvels, but unfortunately the link to the demo was dead.

One streaming technology that performs impressively is 'RealityWave' (www.realitywave.com). It rendered the demo models on the site very prettily (see screenshot bottom left on opposite page), and boasts nice, simple navigational controls. These include a tool for selecting a 'part' of the model, which is then displayed on its own. Models are stored in the 'XGL' file format, that RealityWave claims 'is becoming universal among CAD and 3D-graphics programs', which I think is a tad exaggerated.

A more serious problem for me is that the viewer is only available as an ActiveX

THERE ARE NO EXPLODING SPACESHIPS OR MAJESTIC VISTAS IN THIS IMAGE BY GEOFF HOLMAN OF BRITISH COLUMBIA IN CANADA, BUT THAT'S ONE OF THE REASONS I LIKE IT. I THOUGHT THE LIGHTING AND TEXTURING IN THIS WAS PARTICULARLY IMPRESSIVE. IT WAS CREATED USING TRUESPACE 4. THE IVY IS THE SORT OF DETAIL MOST 3D ARTISTS FIND DIFFICULT, BUT HERE IT'S BEAUTIFULLY REALISED. IT WAS CREATED USING A COMBINATION OF TEXTURE MAPPING AND GEOMETRY. YOU CAN SEE GEOFF'S WORK AT WWW.ZARGONSTUDIOS.COM.



control. This is great if you are using Internet Explorer running under Windows, as it will seamlessly insinuate itself into the browser window, but it means it won't run on other platforms.

For years, the problem with 3D on the Internet was that the hardware simply wasn't there to run the content, but that has changed. Nearly all PCs shipped in the past year were supplied with some form of 3D acceleration. Now

it is the software that is the problem, and it looks like it will be some time before a clear standard emerges and the 2D world wide web can get a bit of depth.

PCW CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office or email 3d@pcw.co.uk



MSISpy knew too much

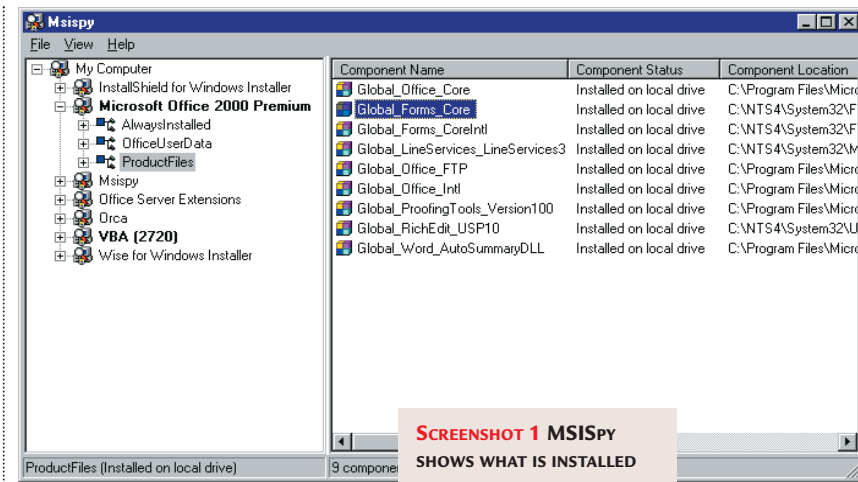
Uninstall routines are messy at the best of times, but this needn't be the case, says Tim Anderson.

Many Windows problems begin with installation. Software reviewers are continually installing products and solving mysterious setup problems is a huge time-waster. Sometimes the only solution is to shrug and try another machine, or even a clean Windows installation. Part of the problem is that uninstall routines do not always work, and even when they do, they rarely leave the system in exactly the state it was before. Ironically, this last issue is doubly true of Microsoft software.

Now imagine how it ought to work. What if Windows kept a database of exactly what software is installed, not only at the application level but right down to individual components and files? You would be able to see at a glance what was installed on any system, without hunting through the Start menu or Explorer folders. Equally, uninstall should work properly since the system knows why each file was installed and for which application.

■ The Windows Installer

Users of Office 2000 will have noticed the appearance of a new gadget called the Windows Installer. This is a setup service that is built into Windows 2000 and which can be added to Windows 95, 98, and NT4 systems. At first glance it is just another installation utility, providing an alternative to third-party systems like InstallShield and Wise. This is a serious misunderstanding. The Windows Installer is a new approach to application management that provides exactly the centralised management described above, plus numerous other features.



To illustrate the point, screenshot 1 shows a utility called MSISpy. MSI stands for Microsoft Installer. It shows all the installed

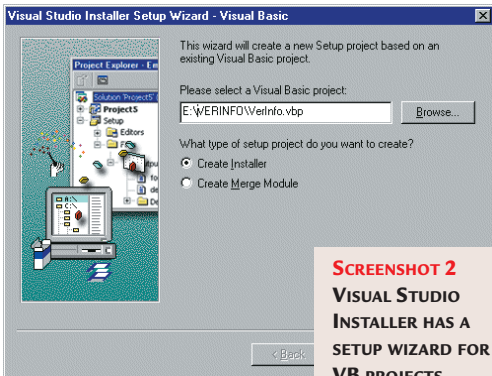
SCREENSHOT 1 MSISPY SHOWS WHAT IS INSTALLED ON THE SELECTED COMPUTER. WHEN YOU SELECT A COMPONENT IN THE RIGHT PANE, THE PRODUCTS THAT USE THAT COMPONENT APPEAR IN BOLD ON THE LEFT

products and lets you drill down into their components and files. A right-click menu gives options to Configure, Reinstall or Uninstall. MSISpy uses the runtime Installer API,

Microsoft is trying to encourage its use by making it a requirement for Windows

certification, the replacement for the old logo scheme. Whether or not it becomes standard remains to be seen.

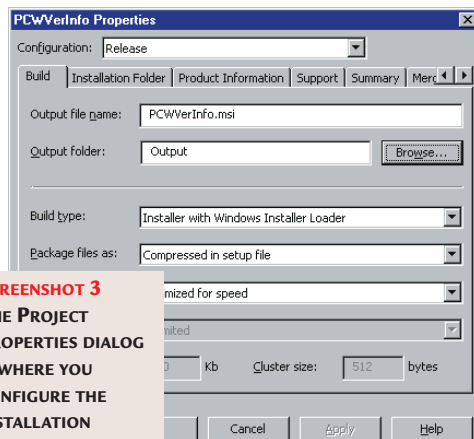
If you want to have a go at this, there's an easy way you can try out the Windows Installer. If you have any Visual Studio product, you can download the Visual Studio Installer for free. Here is how you could make an installation for a simple Visual Basic application, using the version information example from January's column. This is a little utility for viewing the version information in an executable file.



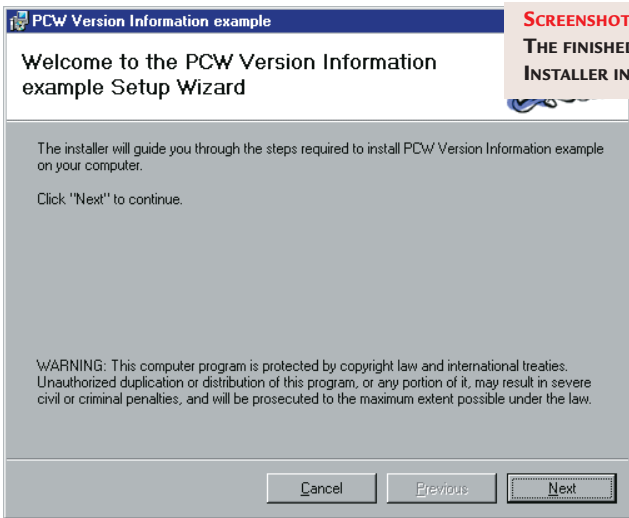
SCREENSHOT 2 VISUAL STUDIO INSTALLER HAS A SETUP WIZARD FOR VB PROJECTS

making the point that in the new scheme of things installation is not a one-shot process, but combines the functions of installation, maintenance and repair.

Unfortunately, MSISpy can only analyse products that have been installed with the Windows Installer, which is why only a few applications are listed. Many developers and software companies have invested considerable effort in installation routines, and are reluctant to throw them away, as they will have to in order to adopt the new system.



SCREENSHOT 3 THE PROJECT PROPERTIES DIALOG IS WHERE YOU CONFIGURE THE INSTALLATION



SCREENSHOT 4
THE FINISHED
INSTALLER IN USE

wizard places the application shortcut at

the very top of the Start menu. To amend this, double-click the File system element in the Project Explorer. In the File System windows, find the entry for User's Start Menu, create subfolders as required and move the shortcut into the right

location. You probably want to rename the shortcut to a friendly name.

5 Now choose Build and find the result, which will be in the Output sub-folder of the Installer project folder. You can test the install by running

SETUP.EXE in the normal way (screenshot 4).

The resulting installation, which only took a few minutes, has some interesting features. For example, if you go to the Add/Remove Programs utility in Control Panel, you will find your application listed. Run it, and the Installer opens with options to Repair or Remove. If you created an installation with several optional components, these would be listed with options to add or remove them. Should the user uninstall the application, the Installer will be intelligent about removing the application files, but not the Visual Basic runtime files. If you now run MSISpy,

Merge modules are designed to be merged into other installations

which you can download along with the Visual Studio Installer, you will find the new application listed.

■ Clever but complex

The Visual Studio Installer is simple to use, once you get your head around the way it works, which is very different to the script-driven solutions used by previous setup utilities. The fundamental point is that the whole process is data-driven. When you edit an Installer project, you are editing a database.

To prove it, download the utility mysteriously called Orca from Microsoft's site, and open the .MSI file you have just created if you followed the earlier example (screenshot 5). It is no more or less than a collection of database tables.

There are several advantages. For example, the Installer can exploit database features such as transactions, so that failed installations can be rolled back successfully and uninstall has a chance of working properly. The Installer database remains on the target machine, enabling utilities such as MSISpy to work.

A great feature of the Installer is called merge modules. These are themselves installation packages, but are designed to be merged into other installations. If you look closely at a Visual Basic installation in Visual Studio Installer, you will see several merge modules listed, with .MSM extensions. MSVBVM60.MSM is the module for the core VB runtime files. If all VB applications use this module, the VB runtime can be managed intelligently by the system.

SCREENSHOT 5 AN
INSTALLER DATABASE
SHOWING ALL ITS
GORY DETAILS

Name	HCentering	VCentering	Width	Height	Attributes	Title	Control	First	Control
ActionText									
AdminExecuteSequence	50	50	373	287	7	[Pro..	Finish	Next	
AdminFinalizeSequence	50	50	373	287	5	[Pro..	Next		
AdminFinalizeForm	50	50	373	287	7	[Pro..	Close	Close	
AdminExecuteSequence	50	50	373	287	7	[Pro..	Close	Close	
AdminUISequence	50	50	373	287	7	[Pro..	Close	Close	
Binary	50	50	373	287	39	[Pro..	Next	Next	
BitmapImage	50	50	373	287	5	[Pro..	Next		
Class	50	50	373	287	7	[Pro..	Close	Close	
Component	50	50	373	287	7	[Pro..	Close	Close	
Condition	50	50	373	287	7	[Pro..	Close	Close	
Control	50	50	330	101	65543	[Pro..	ErrorText		
ControlCondition	50	50	373	287	7	[Pro..	Next	Next	
ControlEvent	50	50	271	78	3	[Pro..	No	No	
CustomAction	50	50	373	287	7	[Pro..	Next	Next	
Dialog	50	50	373	287	7	[Pro..	Next	Next	
Directory	50	50	243	222	3	[Bro..	OK	OK	
Error	50	50	361	192	35	[Pro..	OK	OK	
EventMapping	50	50	373	287	39	[Pro..	Next	Next	
Extension	50	50	373	287	7	[Pro..	Next	Next	
Feature	50	50	373	287	7	[Pro..	EulaForm..	Next	
FeatureComponents	50	50	373	287	7	[Pro..	Close	Close	
File									

All installations and merge modules have a product and an upgrade code. Both of these identify the product, but the difference is that while the product code should change with each significant new version, the upgrade code does not. When you release a new version of your

1 Install and run the Visual Studio Installer, which appears in the Visual Studio group in the Start menu. This takes you into Microsoft Development Environment, as used by Visual InterDev and Visual J++. Choose Visual Studio Installer Projects and then Visual Basic Installer from the New Project dialog.

2 The wizard asks you to select a Visual Basic project (screenshot 2). Find the project file, check Create Installer, and then click Next.

3 The wizard has two translation options. You can either create an installer for any locale, or localised version of Windows, or else restrict it to the current locale, in which case you can use the extended character set. The former is the more attractive option in most cases, so check this one and click Finish.

4 The wizard now creates the installer project. You can now choose Build to create the installer file. Before you do, though, you probably want to change a couple of settings. The dialog for this is hidden away. Select the name of your installation in the Project Explorer, then right-click and choose Properties (screenshot 3). Under Build type, select Installer with Windows Installer Loader. This means that the Windows Installer service itself will be installed, if it is not already present, and is essential if you want to target versions of Windows other than Windows 2000. You can also amend the target location, product name, support details (who to phone for help), and other information. Another tip is that by default the



application, the Installer looks for a previous version with the same upgrade code. If it is present, the Installer offers to remove the old version before installing the new one. Note that there is an option to mark files and registry entries as not to be deleted on uninstall. While this undermines the idea of complete uninstallation, it is essential if you want to preserve user settings on upgrade.

If you dig deep into the Windows Installer, you will find it well thought-out but complex. Nobody wants to contemplate building installer databases by hand, and the Visual Studio freebie has limitations, such as the inability to edit dialogs in the user interface. Another issue is that while the built-in features of the Installer are excellent, there are times when you need a script, to incorporate special logic or processing. It is possible to incorporate scripts, using the Windows Scripting Host, or to call external functions, but not with Visual Studio Installer. The easy solution is to get hold of the new Windows Installer tools from Wise or Installshield, that offer more sophisticated editing facilities. You can also investigate advanced Installer features such as 'install on demand' and patching, both of which are built into the system.

■ Why should you use the Installer?

Microsoft has made surprisingly little noise about the Installer, yet it has the potential to make life easier for Windows users. It is not just a matter of install and uninstall, but it makes the whole system more resilient and reliable. Developers should make the effort to use it.

The new Visual Studio features web forms, that use ASP in the right way

■ What's next in Visual Studio

The next version of Visual Studio is not likely to arrive until the second half of 2000, but Microsoft is already talking about some of the new features. I recently spoke to Dave Mendlen, product planner for Visual Basic and Visual InterDev, who presented two Visual Studio 7 technologies, web forms and web services.

Visual Studio 6.0 is already replete with web features. While the underlying Active Server Page (ASP) technology is impressive, there are some strange

Code for crashing

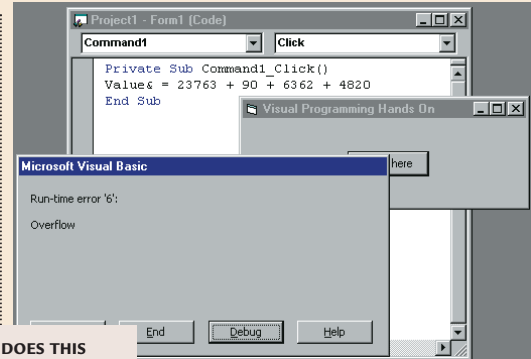
Nelson Jerram is having a pretty serious problem with a piece of code he has written.

He emailed to ask: 'If I have the following code in VB:

```
value&=23763+90+  
6362+4820
```

I get runtime error '6', even though the value variable is long. Why?'

This is because VB uses an implicit variable to sum the values on the right-hand side. Because the first value is small enough to fit in an inte-



WHY DOES THIS CODE CRASH? ANOTHER VB MYSTERY SOLVED.

ger, VB uses an integer type, which then duly overflows. The solution is to use the function CInt to force the compiler to use the a long variable instead.

In other words:

```
value& =  
CInt(23763)  
+90+6362+4820
```

Not very obvious, but that is the fun of programming! (Key: ✓ code string continues)

aspects to how it is used in Visual Studio 6.0. Visual InterDev 6.0 is the primary web development tool, but it tends to encourage authoring ASP scripts, VBScript or Javascript running on the server but stored in ASP pages. At the same time, Microsoft's declared strategy involves minimising ASP script and placing application logic and processing into COM components written in Visual C++ or Visual Basic and again running on the server.

This anomaly is being addressed. The new Visual Studio features web forms, that use ASP in the right way. The scenario is that you can drag a button or other control to a web form, set its properties, and double-click to open the code editor for the events it fires. The code in this case is not VBScript, but Visual Basic or Visual C++, since you are actually editing a COM component. From the browser's perspective, the end result will be standard HTML 3.2 pages for good compatibility.

Web services are another thing entirely. The idea is to get the ease of use of COM components but with messages passing over the Internet as XML, rather

than through Windows networks. The key to this is the ability to build components in the Visual Studio languages that have the ability to define their interface in XML and also to send and receive XML packets. With this done, it becomes possible for web applications running anywhere else on the web to have programmatic access to the component.

The underlying technology is not exclusive to COM, and this would also be a good way to integrate with Java or Corba-based systems. It does mean that Windows developers who are building COM components will have an easy route to creating real distributed applications, where 'distributed' means components running anywhere on the web.

PCW CONTACTS

Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office.

You can download the Visual Studio Installer from <http://msdn.microsoft.com/vstudio/downloads/vsi/default.asp>

Download the Installer SDK from <http://msdn.microsoft.com/developer/sdk/wininst.asp>

For further information, see the newsgroup microsoft.public.platformsdk.msi

Wise is at www.wisesolutions.com, and Installshield at www.installshield.com



Share options

Roger Gann's **step-by-step guide** shatters the mysteries behind sharing an Internet connection.

Apart from a raft of bug fixes and general improvements, Windows 98 Second Edition featured precious few new features, the most remarkable of which was apparently stolen from the Windows 2000 goodie bag: Internet Connection Sharing (ICS), which allows a host PC to act as an Internet gateway for other networked PCs.

Sadly, ICS is poorly documented and not at all obvious how to install, configure and run, which is a real shame as it is perfect for all those homes with two PCs and one phone line.

While it's been possible to share a fax modem since the release of Windows for Workgroups 3.1 in 1993, the ability to fully share a data modem is still an elusive Microsoft feature and you have to invest in Back Office Small Business Server to obtain it. However, Windows 98 SE now includes ICS, which lets two or more networked PCs share a single PPP Internet connection. So, if you have multiple PCs, ICS allows you and others on your local area network (LAN) to perform different Internet tasks simultaneously.

For example, one person could send and receive email, while another person downloads a file and another person browses the Internet. Connected devices receive transparent network configuration using Directory Naming Service (DNS) and Dynamic Host Configuration Protocol (DHCP) to resolve Internet names.

Connected devices and software also have comprehensive protocol support. For example, you can play Internet games without additional configuration, or you can use Point-to-Point Tunneling Protocol (PPTP) and a Virtual Private Network (VPN) to gain access to corporate networks. Note that ICS is only found in the full retail and upgrade versions of Windows 98 SE – the downloadable/free Windows 98 Service Pack upgrade does not include it.

ICS is relatively easy to set up, but there are some pre-requisites:

- At least two computers.
- A functioning network interface card



SCREENSHOT 1

(NIC) properly installed in each computer. If you're sharing a DSL, cable modem, or other Ethernet-based Internet connection, the computer with the Internet connection must have two NICs installed. The network must also be cabled correctly and be functioning normally. The TCP/IP networking protocol must be installed on all the PCs.

- One of the PCs must have a properly configured and working Dial-Up Networking Internet connection, for example a V.90 or cable modem. This PC must be running Windows 98 SE (or 2000).
- The client PCs can be running any flavour of Windows 9x – in fact they can be any IP device. ICS will support MacOS and Linux clients, though Microsoft doesn't advertise this fact!

1 Assuming that you have a networked PC, running Windows 98 SE, with a working Dial-Up Networking connection, the first step is to install ICS. Open Control Panel and double-click on Add/Remove Programs. Click on the Windows Setup tab.

Scroll down to Internet Tools and click the Details button. Tick the Internet Connection Sharing box and click OK, then click Apply. Have your Windows 98 SE CD-ROM handy at this point. The ICS wizard is then launched (screenshot 1).

The first selection you need to make in the Wizard is for the type of connection you will be using. Make sure you select the right one. If you are using a cable modem, you will be asked to select an adaptor, which is your NIC.

Be sure you choose the adaptor that

is attached to your cable modem. If you don't choose the correct NIC, ICS won't install correctly and you'll probably have to remove and reinstall it and try again.

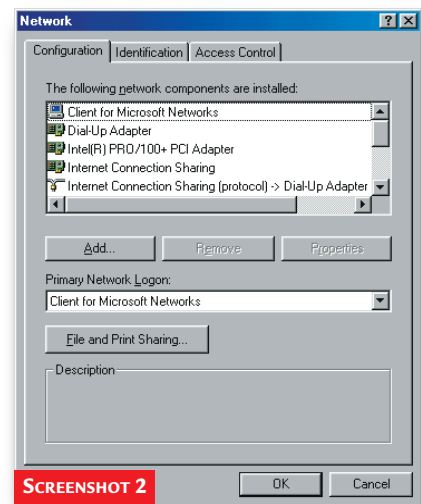
You will see that the ICS Wizard numbers your NICs one and two, but there's no clue as to which is connected to the cable modem and which is connected to your LAN.

You have to guess, and if you guess wrong, you get to go through the whole process again!

Click Next and insert a blank formatted floppy disk in your drive. The wizard then creates a special install floppy to use on the other, client PC. Click OK when the disk has been created, then click Finish and restart your PC when prompted.

Don't click Cancel or restart your computer before completing this Wizard. There's no way to start it again, so if it's interrupted in any way, you'll have to start over, which means removing and reinstalling ICS.

2 To check that Internet Connection Sharing has installed correctly, once the 'gateway' PC has restarted, right-click Network Neighborhood and examine the installed network components on the



SCREENSHOT 2

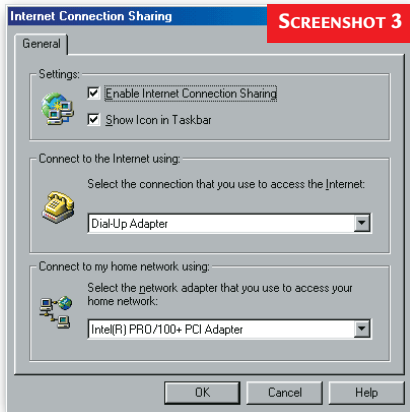


Configuration tab. Internet Connection Sharing should be listed here, as a 'network adaptor'. You'll see three new instances of TCP/IP, like this:

- TCP/IP (Home) -> Your NIC
- TCP/IP (Shared) -> Dial-Up Adaptor
- TCP/IP -> Internet Connection Sharing

The (Home) instance refers to the device used to connect the host to the rest of the home network - if you select it and click Properties, you'll notice that a static IP address (usually 192.168.0.1) has been assigned to it.

The (Shared) instance refers to the device used to provide the shared Internet connection while the last entry is what used to be the TCP/IP properties of your Internet connection.



3 To activate the ICS status icon in the System tray, right-click the Internet Explorer icon on your desktop and select Properties. Click the Connections tab and in the LAN Settings box, click the Sharing button. Tick the Show icon in Taskbar tick box (**screenshot 3**). When you right-click on the ICS icon in the system tray, you can choose:

- Status - This will show you the number of computers using Internet connection. It can take as long as 15 minutes before ICS shows the correct number of connections. This delay is caused because ICS holds Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) ports open for a client for up to 10 minutes after the activity on that port has stopped. When a port is open for a client, ICS counts the port as a connected client. The count of connected computers is updated after the port is closed.
- Options - This will bring up the very limited ICS control panel
- Disable Internet Connections Sharing - Disables ICS

4 Setting up the 'client' PC, (that is, the PC without the modem) couldn't be simpler: you don't even need to install Dial-Up Networking. To start the Browser Connection Setup wizard, insert the floppy disk you made in Step 2. Click the Start button, and then click Run. Type: A:\ICLSET.EXE and click OK. ICLSET doesn't do much - it merely tweaks the client's TCP/IP configuration.

For non-Windows 9x clients, it's easy to manually configure the client PC's TCP/IP settings. Set them to Obtain an IP address automatically (ie use DHCP). Clear any gateway entries and disable DNS as well, while you're at it.

5 To make sure that the 'client' PC is configured correctly, click the Start button, and then click Run. Type WINIPCFG and click OK. This launches the Windows 98 TCP/IP configuration utility. Select the Network Adaptor and you should see a range of settings similar to that in **screenshot 4**. The client PC automatically 'collects' its TCP/IP configuration from the ICS server courtesy of DHCP so if ICS is working correctly, you should see an IP address 192.168.0.2 or similar.

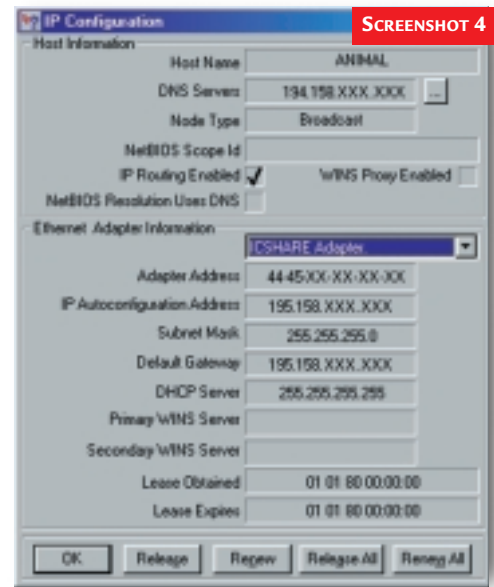
As well as the usual network adaptor and Dial-Up Adaptor entries, you should also find a third here; ICSHARE.

6 With ICS up and running, you can connect to the Internet in the usual way at the 'gateway' PC: either explicitly; using Dial-Up Networking; or by launching Internet Explorer or Outlook Express to cause the system to automatically dial out.

If you launch a browser on the client PC and the ICS gateway isn't currently connected, it will then automatically dial out and connect for you.

Some final caveats: don't forget, the ICS gateway PC has to be switched on and booted up for the other PCs to be able to dial-out through it.

Also, although Windows 98 should disconnect an inactive connection after a specified 'time-out' period (usually five minutes) it occasionally won't. As you won't be able to tell if the connection is still 'up' from the client PC, if you're the only one surfing the Internet, you should



always go over to the ICS gateway PC and make sure that the connection is terminated at the end of your session. This way, you won't get any nasty surprises when the phone bill arrives!

There is no minimum connection speed, but you should keep in mind that when two users are downloading, using the shared connection simultaneously (the worst-case scenario), each user will experience half of the original performance. But for casual web browsing, emailing or game-playing, two users can quite happily co-exist on a 56K modem.

Troubleshooting

ICS has a few gotchas - the Microsoft Knowledge Base has about 60 ICS 'articles' - see www.infinisource.com/techfiles/ics-mskb.html. For example, CompuServe 2000 is a no-no. It doesn't work with CU-SeeMe over DSL connections either.

Commercial alternatives

Proxy - www.analogx.com/contents/download/network/proxy.htm

Wingate - <http://WinGate.deerfield.com>

Sygate - available at www.sygate.com/

PCW CONTACTS

Roger Gann can be contacted at the usual PCW address or by emailing: networks@pcw.co.uk

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- 2 Using the handset on your fax machine, dial 09065 600632. If you do not have a handset, press the fax machine's On Hook or Telephone button, then enter 09065 600632 on the keypad.
- 3 There will be a vocal introduction to the Faxback service which will ask you to enter the code of the article(s) you require. The voice will then ask you to press the Start / Send button on your fax machine.
- 4 The article(s) you have requested will then come through your fax machine.

IMPORTANT INFORMATION

For the faxback service to work correctly, you must be referring to the current issue of *Personal Computer World* and have your machine set to use tone dialling (you may need to switch your machine from 'pulse' to 'tone'). If you have any problems with the *Personal Computer World*

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Other articles are available for faxback. For a full list please enter the code 2000 (3 pages).

Faxback Table

PCs AND NOTEBOOKS	ISSUE	PAGES	CODE
Pentium III PCs group test	April-99	5	2009
400MHz Celeron PCs group test	May-99	11	2010
P11 vs P111 PCs	June-99	13	2011
Budget PCs	September-99	11	2013
Notebooks	September-99	8	2014
AMD Athlon PCs	October-99	10	2016
Ultimate home PCs	November-99	12	2017
Small business PCs	December-99	12	2018
HARDWARE GROUP TESTS	ISSUE	PAGES	CODE
Colour inkjets	February-99	8	2113
Motherboards	May-99	14	2117
3D graphics cards	June-99	6	2119
PDAs and handhelds	July-99	10	2120
Communications hardware	August-99	11	2121
Inkjet printers (budget, small business and photo)	October-99	11	2122
Scanners	November-99	8	2123
Monitors (17in and 19in CRT)	November-99	5	2124
Graphics cards (21 cards compared)	December-99	15	2125
Digital cameras (22 cameras compared)	January-00	15	2126
Best of the best PCs	January-00	11	2127
Laser printers	February-00	12	2128

PCW Faxback number: 09065 600632

Faxback Table (cont'd)

SOFTWARE GROUP TESTS	ISSUE	PAGES	CODE
Web-authoring tools	March-99	12	2215
Contact managers	August-99	7	2220
20 Top Utilities	October-99	8	2221
Accounting software	November-99	9	2222
Web editors (10 packages compared)	December-99	9	2223
Image-editing software	January-00	11	2224
Speech recognition (4 packages compared)	January-00	5	2225
HANDS ON	ISSUE	PAGES	CODE
Linux part 1	January-99	3	2313
Linux part 2	February-99	3	2314
Linux part 3	March-99	3	2315
Website construction part 1	March-99	3	2316
Website construction part 2	May-99	3	2320
Website construction part 3	June-99	3	2322
Multiple boot	July-99	2	2323
3D graphics the Disney way	December-99	2	2325
Setting up a webcam	December-99	2	2326
Using your Mac as a PlayStation	December-99	2	2327
Changing phone codes in databases	January-00	2	2328
DIY dual-Celeron PC	January-00	3	2329
Changing your phone codes	January-00	3	2330
Calculating loan interest	February-00	2	2331
Multiple changes to data and databases	February-00	2	2332
Programming with Perl	February-00	3	2333
SMALL BUSINESS WORKSHOPS	ISSUE	PAGES	CODE
Building a small network	September-98	5	2402
Ecommerce for small business	October-98	5	2403
Building your own web server	November-98	6	2404
Hubs and network starter kits	February-99	4	2407
Firewalls and net protection	March-99	3	2408
IT training for your small business	April-99	4	2409
Backup solutions for your small business	May-99	4	2410
Building a five-user network	September-99	5	2412
Setting up an email server	October-99	5	2413
Remote working	October-99	5	2414
Presentation equipment	December-99	5	2415
Wireless networking	January-00	3	2416
Be a millionaire on the web	February-00	4	2417
All-in-ones vs phone, fax & modem	February-00	3	2418
GENERAL FEATURES	ISSUE	PAGES	CODE
Office 2000	June-99	5	2519
Anti-virus	August-99	5	2521
Memory	August-99	2	2522
Upgrading	December-99	6	2524
Windows 2000	February-00	5	2525

PCW Faxback number: 09065 600632

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HELPING HAND



Each month Anthony George, our customer services manager, gives advice on what to watch out for when buying computer equipment off-the-page.

There is still a great deal of confusion between consumers as to what exactly is the difference between credit, charge and debit cards.

← Credit cards

Credit cards, such as Visa and Access, are regulated under the Consumer Credit Act, and enable you to repay only an agreed proportion of your debt each month.

← Charge cards

Charge cards, such as American Express and Diners, do not afford the same facilities; you are not protected under the Consumer Credit Act, neither are you allowed monthly proportional payments. Your account credit is fixed and your full debt must be repaid each month.

← Debit cards

These are different and although the card holder is able to purchase goods or services, such transactions (unlike credit and charge cards) are not only automatically recorded, but the retailer is immediately credited, and the card user's bank account is instantly debited for the total value of such goods or services.

While this is not a credit agreement – if the account is overdrawn, the card's user may still be protected under the terms of the Act when they pay interest on the debt.

You cannot be held liable for debts totalling more than £50 that may arise as a result of theft or unauthorised use of either a credit or debit card. Even the maximum £50 liability applies only until you have advised the credit or debit card company that you have lost or had your card stolen.

In the case of credit cards, if you owe no money on the account when your card is lost or stolen, you can have any membership fee you may have paid offset against any debt for which you are liable through its unauthorised use.

Remember *caveat emptor*. As I have previously highlighted (see *Buying Advice* in the August 1999 issue of PCW) the protection that a credit card provides in relation to purchases valued at between £100 and £30,000 far outweighs any other method of payment.

In the next issue of *Personal Computer World*, I will be looking at credit notes and credit reference agencies.

Anthony George, Customer Relations Department, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG

order form

Use this form when you order by phone, fax or post.

SUPPLIER'S DETAILS	CUSTOMER DETAILS
COMPANY	NAME
SALESPERSON'S NAME	COMPANY
ADDRESS	ADDRESS
.....
..... POSTCODE POSTCODE
DATE OF TELEPHONE ORDER / / TIME	DATE OF TELEPHONE ORDER / /
ORDER REFERENCE NUMBER (IF QUOTED)	ORDERED BY: <input type="checkbox"/> TELEPHONE <input type="checkbox"/> FAX <input type="checkbox"/> POST
DESPATCH REFERENCE NUMBER	ADVERT APPEARED IN PCW: ISSUE DATE PAGE

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

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 C.O.D
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 OTHER (SPECIFY)
 CARD COMPANY
 ISSUE NUMBER (debit cards only)
 START DATE / / EXPIRY DATE / /
 CARD NUMBER / /

SUB-TOTAL	_____
DISCOUNT	_____
CARRIAGE	_____
SURCHARGES	_____
VAT	_____
TOTAL	_____

SIGNED
 DATE/...../.....
 DAYTIME TELEPHONE NUMBER

DELIVERY ADDRESS

 POSTCODE
 AGREED DELIVERY DATE / /

Purchasing Guidelines

There are several steps you can take to help ensure that the buying process is smooth and trouble-free. We'd like to suggest these main guidelines:

● KEEP RECORDS

When you phone a supplier, make a note of the name of the person you speak to, and when. Note down any claims they make for the product in which you are interested, or any specifications they mention. If you are unsure that what they are offering is right for the task, then ask.

● GET A FULL SPEC OF THE MACHINE

Before you place an order for a machine, insist on being faxed or emailed a full specification, detailing all components and peripherals. Check what is included: for example,

when buying a printer, are all cables and cartridges bundled in? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

● BE CLEAR ABOUT SUPPORT AND WARRANTIES

Make sure that you get a warranty which suits your needs and is fully detailed in the quotation. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand the level of service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

● USE CREDIT CARD PROTECTION

When you place your order, use a credit card. The Consumer Credit Act ensures that credit card purchases between £100 and £30,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the Internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

● SET DELIVERY DATE AND CHECK WHAT'S DELIVERED

This gives you some comeback if the goods are not delivered on time. When the goods arrive, check the packaging before you sign for them, to guard against damage in transit.

Inside Relational Databases ▶

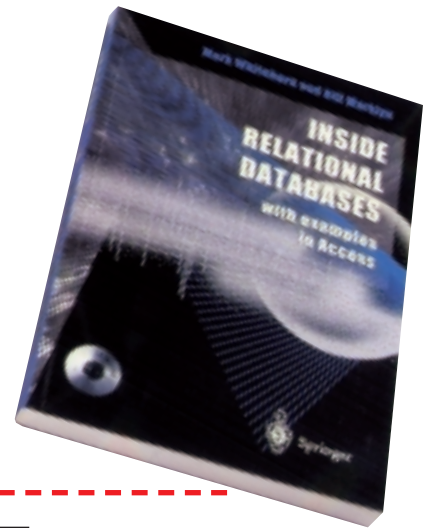
(reviewed in PCW November 97, p329)

- Written by Mark Whitehorn, who writes PCW's *Hands On Databases* column.
- Explains all you need to know to create efficient relational databases.
- Avoids the usual database jargon.
- Includes masses of examples using Microsoft Access.
- Source code for all examples is on the accompanying CD.
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Reader offer price £14.50

Subscriber price £13.05

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◀ Remembering the Future

- Collected interviews from *Personal Computer World*, including Bill Gates, Michael Dell of Dell Computers and Intel's Andy Grove.
- Reader offer price £9.95 — over 30% off the RRP of £14.95.

Reader offer price £9.95

Subscriber price £8.96

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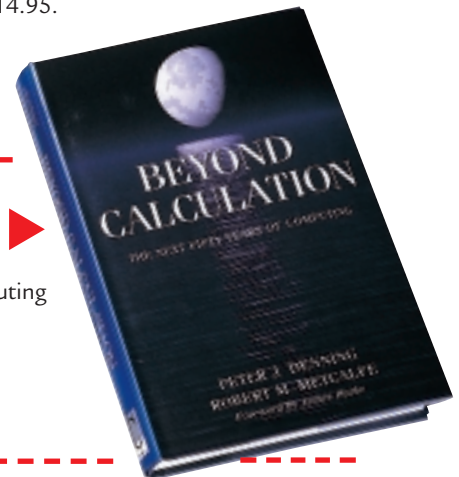
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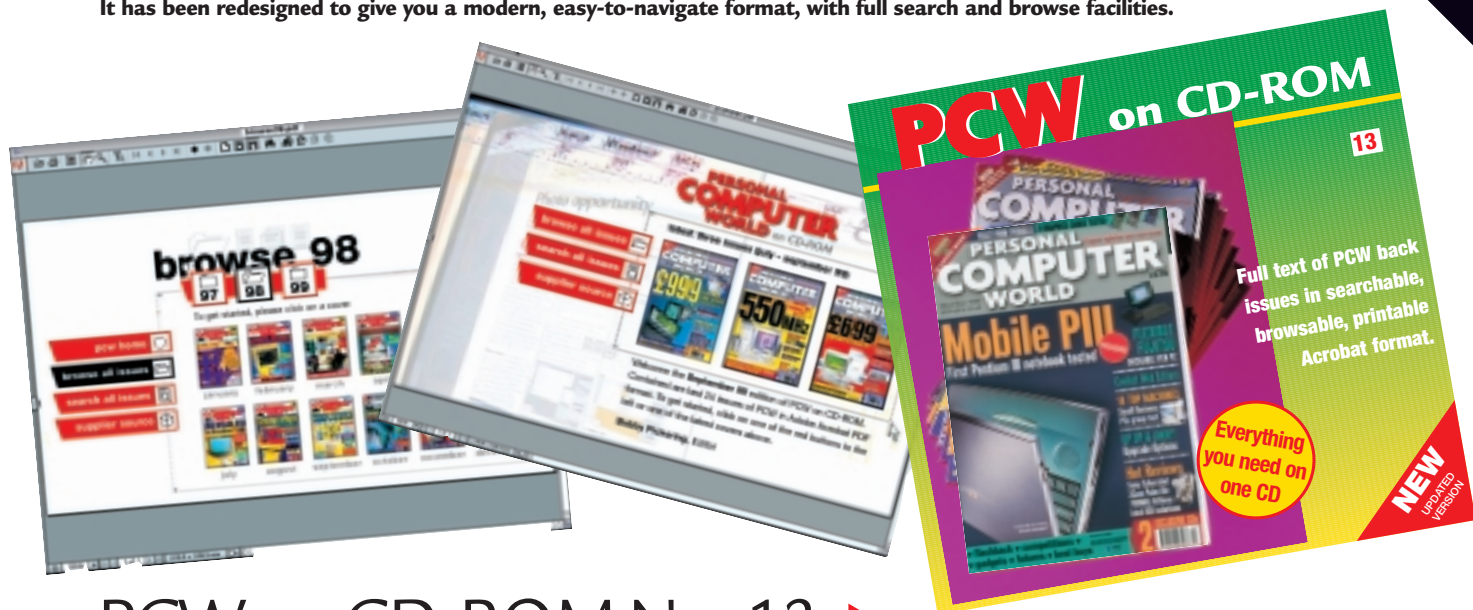
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Final Fantasy VIII

The latest chapter in the series that has already sold more than 25 million copies worldwide made a bit of a splash on the PlayStation late last year. The PC version of Final Fantasy VIII is due for release shortly and it looks set to be pretty impressive. It will be very similar to the PlayStation version, but the graphics engine has been tweaked to take full advantage of the superior graphics and sound offered by the PC.

The eighth instalment of this role-playing adventure maintains the distinctive Japanese look of the previous chapters, but increased detail is promised this time, with better facial expressions and movements.

The tradition of giving the characters bizarre names has been upheld. You play Squall Leonhart, a cadet at the local military academy SEED, who is thrust into a conflict between two adjacent countries. As part of his final exam, he's sent in to settle the dispute between the two warring nations. There's no chance



of a re-sit if things go wrong, though, and the fate of the two continents rest wholly on his shoulders.

Early reports suggest that the full-motion video sequences are a joy to behold, and we can't wait to see the finished version, due in a month or two. Developer Squaresoft has also invested a lot of time ensuring that the 3D sound helps enhance the atmosphere. It's inevitable that the game will come on a lot of discs, and the recommended retail price is projected to be as much as £45 – but this is bound to be discounted. Look out for a full review in *PCW* soon and keep an eye on www.eidos.com.

JASON JENKINS

Halo

Bungie Software's new title, Halo, is reaching its final stages of development and first impressions are great. Bungie has a reputation for wholeheartedly supporting the Mac, so it's no surprise that the game uses OpenGL to support both PC and Mac. Jason Jones, the creator of Myth and Marathon, is the brains behind this 3D action game. Granted, there are loads of these on the market at the moment, but this one looks as if it might be a little bit different.

First, the new graphics engine looks stupendous. It uses a system of inverse kinematics in real time to model each character on the screen. Each character essentially has a skeleton inside it, and each joint is assigned its own properties

and moves accordingly, giving very realistic action. The one example of this that has been widely demonstrated involves a jeep. The driver slams on the brakes and the characters inside are thrown forward in a very life-like way.

The background story to the game is that you are among a group of humans on a large ship that has crash-landed on a ring-shaped world (the 'Halo' of the title). The Covenant, a nasty enemy intent on your destruction, soon rears its head. You have to use guerrilla tactics to fight the technologically superior foe, picking up weapons and vehicles they



have left behind and overcoming the problems created because all your comrades are spread out over the ring.

There's still quite a lot of development work left to do, and release dates vary from anywhere between March and August. Whenever it does turn up, it's bound to cause a bit of a stir, though, and there'll be a full review in *PCW*.

<http://halo.bungie.com>

JASON JENKINS

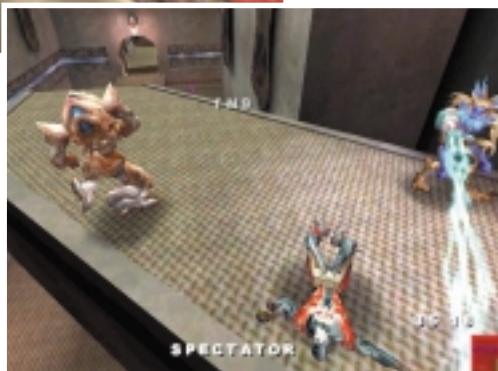
Quake III Arena

Get rid of all that tension built up during the great wait by **building up a few frags in the Arena.**

It's been a long time coming. After months of playing and discussing the merits of the test maps downloaded from the Quake III Arena website, we couldn't wait to get our hands on the finished product. One question dominated our thoughts as we played it for the first time: does it live up to our expectations? Thankfully, the answer is a resounding yes.

Virtually all games that are released at the moment come with some sort of multiplayer capability built in to them. Most software houses are currently having difficulty developing the single-player experience any further, but multiplay has come on in leaps and bounds over the past few months. Although Quake and Quake II both had multiplayer capability, this latest version has been developed with the intention that this will be the normal mode of play rather than the exception. As such, it's no surprise that we consider it to be the ultimate expression of deathmatch gaming.

The new maps have been beautifully designed using a new engine that has the ability to render curved surfaces very effectively. Even the less dramatic maps look amazing with vivid colours and fantastic levels of detail. You won't have much time to stand there admiring the scenery, though, as the graphics move at a terrifying pace. There are less out-of-the-way, darkened corners to hide in here, and our best advice to you if you don't want to get killed is to keep moving. There are loads of pick-ups littered about each level, one of the most terrifying of which is quad damage. If you're unfortunate enough to come up



against someone who has picked this up, you'll see them glowing with a blue fire that gives their weapons a quadruple kick of nastiness.

Ladders have been completely abolished from all the maps. In their place have come ramps and bouncy pads that propel you through the air to another section of the arena. This makes gameplay a lot slicker and faster. Choice of weaponry is appropriate – there are no gimmicky toys in this version and you'll soon find the one that suits your style best. The rail gun, which inflicts massive damage in one hit, makes a welcome return. You can also choose from devices such as a rocket launcher, plasma gun and grenade launcher.

Novices can break themselves in gently by using the single-player setting

to fight against computer-controlled opponents. There are five different skill settings here – the easiest (I can win) is a good training ground as it's difficult to get killed in the early stages. The hardest (Nightmare) is a fierce test for even the most hardened Quake player.

Once you've got the hang of it all, it's back to the same map for some deathmatch action over your LAN or the Internet. There are also four extra maps for capture the flag. You can play these with either humans or computer-controlled characters. It's at this point that we really started to appreciate the fantastic AI that has been written into the game. Your computer team mates can understand typed instructions, which makes it possible to play capture the flag without a full complement of humans.

There's no doubt that this game is fantastic, but the crucial question remains as to whether it is better than Unreal Tournament featured a

couple of issues ago in PCW. The answer is probably yes, but only just. Quake III Arena is deathmatch at its most refined. You don't get quite as many features as you do in

Unreal Tournament, but for sheer fast, furious and unadulterated rage against your fellow gamer, there is simply no equal to Quake III Arena.

JASON JENKINS

PCW DETAILS

★★★★★

Price £34.99 inc VAT

Contact Activision 01895 456 700

www.quake3arena.com

System requirements Pentium 233MHz, 64MB RAM, 8MB OpenGL graphics card, 28.8Kbits/sec modem or LAN, Windows 95/98/NT



Tomb Raider IV

Lara's back as a 16-year-old in a stunning adventure to reverse a curse she's put on mankind.

The arrival of a new Tomb Raider game before Christmas is always a joyous occasion for me. My wife is a huge fan of the series and the thought of her spending the Christmas break without Lara to keep her company wasn't a pleasant one. That said, it looked like Core was running out of steam with Tomb Raider III. The game was nowhere near as polished as the previous titles and there seemed to be a worrying number of bugs in the code. I was therefore a little sceptical about the quality of Tomb Raider – The Last Revelation, but I soon found out that my fears were completely unfounded.

The Last Revelation is, without a doubt, the most impressive Tomb Raider game since the first jaw-dropping outing back in 1996. The game just oozes quality. Gone is the static options screen on start-up, replaced by a silky-smooth fly-by through one of the levels, ending with a shot of Lara busy adventuring. It actually takes some effort to tear yourself away from the options screen and start the game.

Also gone is the regular option of running around Lara's stately home on a training mission. Instead you are transported back in time and play Lara as a 16-year-old running around a tomb with her mentor. Unlike the previous training levels, this one has to be played all the way through. Anyone who's played the previous games may find the constant instructions a little annoying, but it does provide some interesting background to Lara's story.

The game is visually stunning, especially if you have a decent enough graphics card to run it at a high resolution and colour depth. Running it on a K6-III 450 with a Matrox Millennium G400 produced beautifully

fluid movement at a resolution of 1,024 x 768 with 32bit colour. The camera tracking is much improved as well, so you're far less likely to be stuck in a position where you can't see what you need to do. Also, if the camera is behind Lara when you press the Look key she becomes semi-transparent to give you an unrestricted view of the area.

Controls are pretty much standard for Tomb Raider although there is the addition of a Sprint key. Pressing Sprint while Lara is running will give her an additional burst of speed, but only for a limited time. There are also ropes for her to climb and pressing the Sprint key here will allow Lara to swing back and forth to navigate large gaps.

In a strange twist of fate, Lara is responsible for releasing a catastrophic curse on mankind and has to spend much of the game trying to put things right. The feeling of interaction with the story line is high and the cut scenes are the best I have ever seen on a game. Not only do they look good, the sound and lip-syncing make it look like a high-quality animated movie.

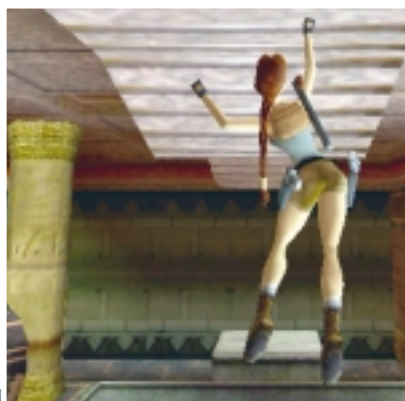
The menu system has been completely changed. Rather than having the old rotating circles when you hit Escape,

your inventory now just scrolls across the top of the screen, while the quit game option is found under the pause menu, accessed by pressing the P key.

Ultimately, this is the best Tomb Raider game yet, not to mention one of the best games I've ever played. It's the closest that a game has ever come to a cinematic experience and this goes a long way to prove that Lara's got a fair bit of mileage left in her.



Some very unusual camera tricks are also used. Sometimes, when an enemy is tracking Lara, the camera takes the pursuer's view as it hunts for you and then switches back to a standard view once Lara is in its sights. This adds a great deal of atmosphere to the proceedings, as do the sweeping camera fly-bys that you get when you enter a special room.



RIYAD EMERAN

PCW DETAILS



Price £34.99 inc VAT

Contact Eidos 020 8636 3000

www.eidosinteractive.com

System requirements Pentium 233 (PII 266 recommended), 16MB RAM (32MB recommended), 3D accelerator card, four-speed CD-ROM, Windows 9x



Indiana Jones

A 3D world beckons Indy but watch out for his **slow reverse speed** if you need a fast escape.

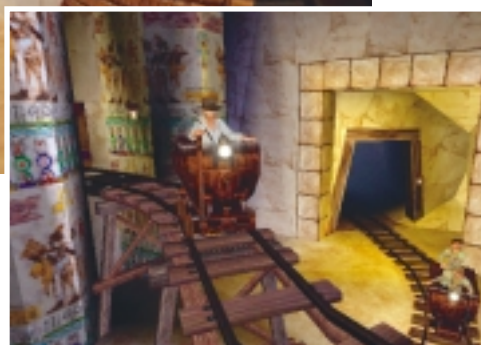
As if rekindling the fire of *Star Wars* fever with the release of *Episode I* wasn't enough for George Lucas, he's decided to bring his other great movie franchise to life again, *Indiana Jones*. If you don't know who Indiana Jones is you must have been living on a desert island for the past 20 years. Indy (as he's known to his friends) is a world famous archaeologist and adventurer. He travels around the world rescuing priceless treasures and damsels in distress in equal measures. As such, Indy is a great hero for both movies and video games and his previous point-and-click graphic adventures were a great success.

This new instalment, *Indiana Jones and the Infernal Machine*, is something different though. Instead of a point-and-click interface Indy now inhabits a fully 3D environment. You'd be forgiven for thinking that the visuals resemble *Tomb Raider* because they do. In fact the game could be *Tomb Raider* except the hero is a guy in a hat rather than a girl in a tight vest. Even the control method is an

almost exact copy of *Tomb Raider*, with a couple of alterations thrown in for good measure. Of course, this isn't necessarily a bad thing. The *Tomb Raider* series has been very successful, and producing a similar title with a well-known character such as Indy into the bargain should be a winning combination. However, it doesn't quite hit the mark.

There's nothing particularly wrong with Indy, it has all the atmosphere that you'd want from a game based on the movies, the visuals are OK and the spot sound effects are entertaining. Unfortunately, the whole game seems very basic when compared to the superb *Tomb Raider IV*. If Indy had come out a couple of years ago it would have looked great, but Core has refined the gaming engine for *Tomb Raider* into an almost

seamless virtual environment that you can lose yourself in, whereas the Indy engine doesn't have that immersive quality. Even the character models are



unconvincing with your CIA contact looking like he has hammers on the ends of his arms instead of hands.

Even taking all its faults into account, Indy is still entertaining to play and if you can look past the rough edges you'll find a great game.

As with Lara Croft, Indiana Jones has an arsenal of weapons at his disposal, although at the start of the game he is equipped only with a revolver, his trusty bull whip and bare fists. The whip is more than just a weapon though; you can use it to swing across large gaps or to scale heights.

However, there is a problem when you're in a firefight. Whereas Lara will

happily run around while tracking her enemies with her weapon and firing, Indy finds this all a bit beyond him. What's most alarming, though, is his inability to make a hasty retreat. Instead of jumping back out of harm's way like Ms Croft, Indy insists on taking careful and painfully slow steps backward, which is particularly annoying when you're under a hail of bullets.

The puzzles are a good medium between taxing and easy and you're not left running around for hours trying to figure out what you're supposed to be doing. A great touch is a map button.

Once activated you're presented with an overlaid map so you can chart your progress as you move around the level. If you're desperately stuck you can activate hints on the map that show you where you should be heading next. You'll also find treasure throughout the level that earns you money, then once the level is completed you can spend your cash on

equipment such as ammo or medical supplies. It's worth noting that using map hints takes a chunk out of your bank balance.

Ultimately, Indy is a good game with a lot

of longevity, but with *Tomb Raider IV* out there it can't quite compete. That said, when fans of the genre have finished Lara's latest quest, they could do a lot worse than give Indy a try.

RIYAD EMERAN

PCW DETAILS

★★★★

Price £34.99 inc VAT

Contact Activision 01895 456 700

www.lucasarts.com

System requirements Pentium 200MHz, 32MB RAM, 3D Graphics Accelerator, Windows 9x

TrickStyle

City-surfers of the future unite in a slick and tricky PC version of a Dreamcast success.

TrickStyle was one of the first games to be released on Sega's Dreamcast machine and I've been playing it on that format since the console's release last October. TrickStyle was an instant success on the Dreamcast due to its playability and jaw-dropping visuals.

Based in the future, the game follows the sport of hoverboard racing, with a style not too far departed from snowboarding. One of the best aspects of the game is the locations of the races, spread across England, Japan and the US. The English tracks are especially entertaining since you can pick out London landmarks in the futuristic landscape.

Visually TrickStyle on the PC looks even better than its Dreamcast sibling, mainly because you can bump the



resolution up a lot higher on a PC monitor than you can on a TV. The movement is smooth as silk and a decent frame rate is achieved even when there's a lot going on. Of course you'll need a decent 3D accelerator card to get the best out of it.

I was initially concerned about how the control method would work since the analog Dreamcast controller is such a joy to use. Thankfully my fears were put to

rest when I started playing. Even using the keyboard as the control method was no problem, but if you want a similar experience to the Dreamcast you could invest in an analog gamepad.

The races are fast and frantic and you'll have to master your jumping and 360-degree spins to make it through some of the more tricky courses.

Ultimately, in a world saturated with stale genres, TrickStyle is original, beautiful to look at and fun to play.

RIYAD EMERAN

PCW DETAILS



Price £39.99 inc VAT

Contact Acclaim 020 7344 5000

www.acclaim.com

System requirements Pentium 233MHz (300MHz recommended), 32MB RAM (64MB recommended), 190MB hard disk space, four-speed CD-ROM, 3D accelerator card, Windows 9x

Force Feedback Wheel

The complete racing experience without the cost.

If you're a fan of the more realistic driving games then you'll know how frustrating it is when you buy an excellent driving simulation but have to use the keyboard to control your car. The solution to this has been to buy a steering wheel, but unless you could afford to pay a few hundred pounds they tended not to be force-feedback capable.

This latest Ferrari-licensed racing wheel from Guillemot is, but doesn't cost the earth. It has all of the controls you could possibly want in one unit. Located between the wheel and the base are two Formula 1-like gear-change paddles that are perfectly positioned for ease of access. On the front of the wheel itself are two buttons to which you can assign different functions depending on the game. To the left is a four-in-one button that is most useful for changing viewpoints in a game.



On its right is an eight-way D-pad. One bonus is the inclusion of a gearshift lever to the right of the wheel which has a solid action for changing gears manually while driving. Two pedals are included on a separate base. The wheel itself is beautifully styled and feels very solid, giving you an extra degree of control over your game.

When playing a game that implements it well, the force feedback is

excellent, and brings you as close to a perfect driving experience as you can get without getting in a real car. It also comes with both serial and USB connectors on a single lead for added flexibility.

We were expecting a wheel with all of these features to cost a lot more than it does, but the £89.99 RRP is a real bargain. This is definitely a product we would recommend for people who have always wanted a good force-feedback wheel but couldn't afford one.

JASON JENKINS

PCW DETAILS



Price £89.99 inc VAT

Contact Guillemot 020 8686 5600

www.guillemot.co.uk

System requirements Windows 95/98/NT, free serial or USB port

➤ A laboratory condition

Dr Dolly is a scientist. He's been working non-stop in the labs for several weeks when his wife breaks in to find out exactly what's been going on, only to find that he has cloned himself. There are now three, apparently identical Dr Dollys, and Mrs Dolly must find out which is the real one.

After reading through the doctor's notes she discovers the distinguishing characteristic of the clones is that they always lie. So she asks the first Dr Dolly if he's the real Dr Dolly, but unfortunately she doesn't quite hear his answer. She asks the second man what the first had said. The second doctor replies 'Yes'. She now knows which of the three is the real Dr Dolly. How?

Find the solution and you could have a chance to win a mystery software prize. Send the solution, your name, and an

address where the prize can be sent on a postcard to: PCW Prize Puzzle (March 2000), VNU House, 32-34 Broadwick Street, London W1A 2HG or by email to: letters@pcw.co.uk. Answers should arrive no later than 20 March 2000. Please note we DO NOT open attachments.

➤ Winner of December's Prize Puzzle

The December puzzle was controversial. It was published with a paragraph missing. We apologise for this. Those who contacted us were given the correct problem, which should have read:

I dreamt the other night that my brother and I were in a huge marathon race in which all competitors were given numbers – assigned sequentially, starting at one. The elite runners in the race (which we were not!) had numbers less than 100. My brother's number was lower than mine.

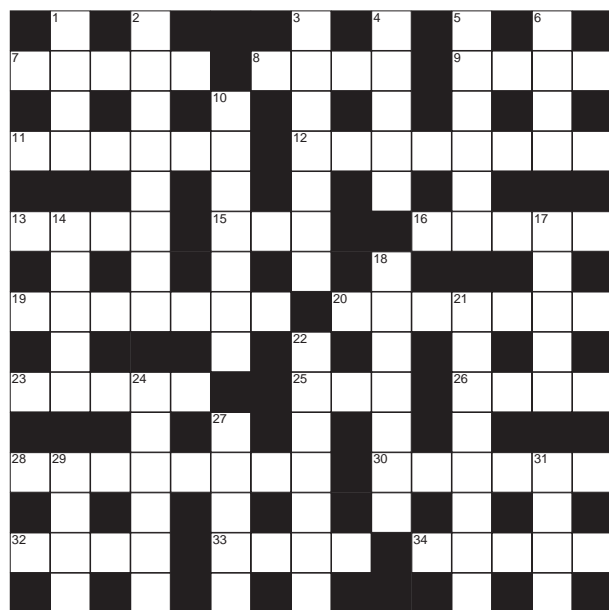
I calculated that the sum of all the numbers less than my brother's number differed from the sum of all the numbers greater than my number by less than 10. Surprisingly, each of these sums also differed by less than 10 from the sum of all the numbers between us, ie all those numbers greater than my brother's and less than mine.

Given that there were fewer than 100,000 taking part, just how many runners were there?

By the way, the answer to the Quickie was also given in this problem – a word ending in MT – you can easily see it.

A total of 27 entrants got and solved the correct problem. The answer is there were 8,591 entrants – my number was 7,015 and my brother's was 4,960. The winning entry came from Peter Forty of Ipswich. Well done Mr Forty, your prize is on its way.

prize crossword



ACROSS

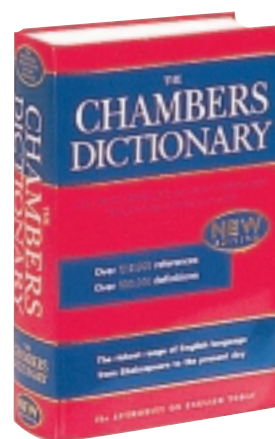
- 7 See 12 Across
8 Indulge in Internet banter (4)
9 Interactive TV platform (4)
11 Printer, modem or scanner and so on (6)
12 & 7 Computing notation in the form a x bn (8-5)
13 Surfer's first page (4)

- 15 Numerical security code (abbrev) (3)
16 'Assumed name' icon (5)
19 Regenerate a page (7)
20 Like data that's damaged or unusable (7)
23 Simple language (5)
25 Old colour screen standard (abbrev) (3)
26 Set of letters, numbers and symbols (4)

- 28 The C of PCW (8)
30 Blinking indicator (6)
32 New high-bandwidth copper-wire technology (abbrev) (4)
33 Put an application or file onto a system (4)
34 Answer an email (5)

DOWN

- 1 Adoration (4)
2 Mechanical expert (8)
3 Rubbing harshly (7)
4 Backless seat (5)
5 Not living for ever (6)
6 Observed (4)
10 Storm (7)
14 Musical drama (5)
17 Colorado resort (5)
18 Supreme ruler (7)
21 Alluded (8)
22 Have too much food (7)
24 Pushes forward (6)
27 Market table (5)
29 Betting chances (4)
31 Painting medium (4)



Each month, one lucky PCW Crossword entrant wins a copy of the new *Chambers Dictionary*. The winner of January's puzzle is: **Paul FitzPatrick of Romford, Essex.**

This time, it could be you. Send your completed crossword to: 'PCW March – Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 20 February 2000.

• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Solutions to February's crossword

ACROSS

- 7 Emoticon 9 Domain 10 Beta 11 E-commerce 12 Ascll 14 Newbies 18 Cookies
19 Virtual 22 Traffic 24 Modem 26 Sound card 28 Drag 29 Access 30 Machines

DOWN

- 1 Immersion 2 Stoa 3 Acted 4 Adam 5 Emerge 6 Mice 8 Nooses 13 Ink 15 Brim 16 Beef 17 Lacerated 20 Two 21 Disarm 23 Roused 25 Edict 26 Sack 27 Dash 28 Drip

Will Head looks back at those who **ran the country**, drove C5s and survived BT's number change.

20 YEARS AGO March 1980



PCW covers have come a long way since 1980, when March's featured the Chancellor of the Exchequer complete with red briefcase but, alarmingly, a computer for a head. This was in

reference to a computer simulation of the country's economy that let readers, have a go at running the country for eight years. The article included not only the full 190-line listing for the program in BASIC (you had to type it in yourself in those days) but also explained all the equations used in the routine.

Panasonic provided the machine to be scrutinised in the benchtest, a JD-700U. The machine was no lightweight, weighing in at 30Kg, although the main unit did house the keyboard, processor and monitor. A 2MHz 8085A CPU had been chosen to power the machine coupled with 32KB of RAM. The 12in screen could display 24 lines, each of 80 characters, and the dual disk drives took single-density 5.25in floppies (the type that really were floppy). The price for this, I hear you ask? A modest £3,985. Although primarily designed for the business market, we concluded that 'it will probably end up as the basis for a variety of turnkey business systems, where its uncompetitive price can perhaps be disguised in the overall cost'.

At the back of the issue Sue Eisenbach and Chris Sadler had reached part seven of the 10-part series 'Complete Pascal'. At the time Pascal may have looked like it had a bright future, unfortunately now it has been relegated to the same league as Latin. It's one of those languages that people insist on teaching even though no-one in the real world actually uses it.

15 YEARS AGO March 1985



In 1985 the cover of PCW featured the strap line 'Let Battle Commence', referring to the fight for supremacy between the Atari ST and the Commodore C128.

Although not quite as monumental as the clash between the Amiga and the ST, the article found that, despite being very

different machines on paper, they were competing for the same, rather confused market. Both machines offered business and home capabilities and, as a result, weren't ideally suited to either market.

A rather miffed Guy Kewney also looked at the Sinclair C5, starting 'My original intention was not to report on Sinclair's C5 vehicle: apart from commenting wryly that it's truly amazing.' He continued: 'The editor, however, disagreed. Hence the picture story that appears later.' For those who haven't had the experience of almost running one over, the C5 was an electronic vehicle that relied on a combination of peddle and battery power. The rider assumed a sitting position to operate the machine, hence its limited visibility to other road users.

This issue's benchtest looked at the North Star Dimension. At a time when we were seeing the first cheap IBM PC/AT clones the Dimension presented a different angle: a multi-user system offering a lower cost per user than using separate machines. The Intel 80186 16bit processor was clocked to a whopping 6MHz, with memory coming in at a mere 256KB. While a two-user configuration would set you back £5,875, North Star claimed that a five-user system would cost 40 per cent less than four IBM PCs networked together.

10 YEARS AGO March 1990



'The Future PC? Intel's DOS/Unix Power PC from £3,995' asked the cover of 1990's March issue. At the time the question was a serious one but with the benefit of

hindsight now looks a little unlikely. The system we reviewed was a 25MHz 386 with 4MB of RAM. However, systems based on the 486 and 386SX were also available. To compensate for the fact that Unix alone could tie up most of the processing power of the 386 chip and accompanying maths co-processor, a Unipower graphics board was available for those who needed powerful graphics capabilities. With a Unipower card on board, the system could stretch to a maximum resolution of 1,280 x 1,024 with a palette of 256 colours. Andrew Taylor concluded: 'The MicroSystem

Series 3000 [is] one of the most robust low-end Unix workstations I have seen. At £8,384 the machine does not break any records in the price/performance stakes, but for most the benefits of being able to run PC applications with little loss of performance easily outweigh this.'

On a lighter note Finnarr Murphy delved into the intricacies of the TCP/IP protocol that everyone was talking about. The article explained how data was transmitted across the network in packets as well as delving into SMTP, FTP and TelNet in operation.

5 YEARS AGO March 1995



March 1995's cover boasted a 'Notebook Supertest', including '40 Colour Portables - one for every pocket'. Other items of interest included a 110MHz PowerMac, the fastest

available then, and the Cyrix 585 chip that was set to take on Intel.

The news pages included a warning about the impending BT number changes. Five years later we are on the brink of another fairly significant change. Back in 1995 'One Day' was the issue - the addition of an extra '1' to most area codes with the deadline for compliance being 16 April.

Intel's now famous floating-point Pentium bug also made the news, with the company offering a no-questions-asked replacement policy for faulty chips. Previous to this Intel had only offered replacements to users of 'vulnerable high-precision applications'.

The Matrox MGA Impression Lite graphics card caught our eye in the reviews section. Today 3D graphics acceleration is considered a necessity not a luxury but in 1995 things were distinctly different. For £245 you could secure a competent graphics card, supporting resolutions of 1,280 x 1,024 at 16bit colour, more than adequate when 14in and 15in monitors were the norm.

Editor's Choice in the notebook group test was won by the Texas Instruments' TravelMate 4000. The 486 DX4-75 processor coupled with 4MB of RAM may have gobbled up £4,509, but the superior keyboard and TFT screen meant that the TravelMate beat the big boys to the crown.

Sinclair ZX Spectrum

A sleek black box that turned a generation of schoolkids on to computers – it must be the Spectrum.

In 1982 an advert appeared in the computer press with the headline, 'Colour and sound... full-size keyboard... 16K or 48K RAM... high-resolution graphics'. It was Sinclair's advertising spread for the ZX Spectrum warning the unsuspecting computer-using public that Uncle Clive was about to do it again. While Sinclair continued to describe the ZX81 as 'the ideal introduction to computing', it was the Spectrum which would set the UK's enthusiasm alight and become the best-selling home computer in the country.

The Spectrum suffered from Sinclair's infamous delays, but eventually emerged to mail-order punters in July 1982. Unlike the ZX80 and ZX81, it came ready-made in two memory configurations: 16K for £125 and 48K for £175.

Once again, Sinclair had opted for an 8bit Z80A processor, which the Spectrum drove at 3.5MHz. Joining the CPU, RAM and ULA (handling display and I/O) was a 16K ROM, twice the size of the ZX81's.

High-resolution graphics translated into 176 x 256 pixels, but colour could only be applied in coarser blocks one character at a time at 24 x 32 resolution. Each character was limited to two colours, which resulted in terrible colour-clashing attribute

problems. Programmers had a choice of eight colours, although a BRIGHT and FLASH attribute could be applied.

Sound was aptly described by its command BEEP, which also neatly froze the processor in its tracks. Games programmers got around the problem by alternating bursts of sound with updated action. Mathew Smith, the genius behind Manic Miner and Jet Set Willy, used this trick to great effect, and the dulcet tones of *Hall of the Mountain King* and *If I were a rich man* still ring in my ears.

While Sinclair did an admirable job on the hardware, it was the games programmers who were really responsible for the Spectrum's huge following. *The Hobbit* from Melbourne House brought

Zork-style text adventuring to a wide audience, while Automata's Pimania had the population searching for a genuine golden sundial worth £6,000. The aptly-titled magazine *Crash* was indispensable for Spectrum gamers, who regularly followed the antics of (fictional) letters editor Lloyd Mangram.

One of the best-known games companies was Imagine ('the name of the game'), which became infamous for tabloid stories describing the lifestyles of its wealthy teenage programmers. Responsible for the classics *Arcadia*, *Zzoom* and *Alchemist*, Imagine went bust while developing its massively hyped mega games *Psyclapse* and *Bandersnatch*.

On the subject of hyped games, the Spectrum story cannot bypass Ashby Computers & Graphics, the company behind Ultimate Play the Game. However, unlike many others, Ultimate really lived up



THE 3D ENVIRONMENTS OF ANT ATTACK AND KNIGHT LORE WERE BOTH INNOVATIVE AND IMMERSIVE, IF NOT GRAPHICALLY STUNNING



to its hype, producing the most remarkable games ever to grace a TV in the early 1980s. Led by the brothers Tim and Christopher Stamper (along with sister Louise and Tim's wife Carol), Ultimate cut its teeth on arcade classics such as *Jet Pac* and *Atic Atac*, going on to produce sophisticated graphic

THE SPECTRUM'S RUBBER KEYS MADE FOR SOME SPONGY TYPING AND DIFFICULT RAPID FIRING IN GAMES



adventures.

Legend has it the pioneering isometric 3D *Knight Lore* was completed before *Sabre Wulf*, but held back as the final part of the *Sabre Wulf* trilogy. *Sabre Wulf* was Ultimate's first game costing a not inconsiderable £9.95, and began the company's strategy for secrecy and teaser-style ad campaigns. Ultimate is currently alive and well, programming modern classics such as *Goldeneye* for the N64 under the name of Rare.

It wouldn't be appropriate to forget the wealth of peripherals for the ZX Spectrum either. Just take Sinclair's own Interface 1 & 2, the former necessary to connect the infamous tape MicroDrives. The ZX Printer (AKA the Astronaut's bog roll) also won many hearts, as did the legendary Kempston joystick.

The Spectrum story continued later than many remember. The Plus version was launched in 1984, followed by the 128K in Christmas 1986. Rarer Plus-2 and Plus-3 versions with built-in cassette deck or floppy disk drive arrived in 1987.

Of course, the Spectrum lives on in the Internet. Relive the classic games with the online Java emulator at www.spectrum.lovely.net/ and check out where all the personalities are now at www.kendalls.demon.co.uk/cssfaq/index.html. The Commodore 64 may have bullied its way into many playground brawls, but for my money, the ZX Spectrum was without a doubt the best home computer of all time.

GORDON LAING